

NEW ACORN A5000

IS IT A STEP IN THE RIGHT DIRECTION? TURN TO PAGE 138

PINPOINT • BEEB CLASSICS • SOFTWARE BARGAINS

15 September 1991

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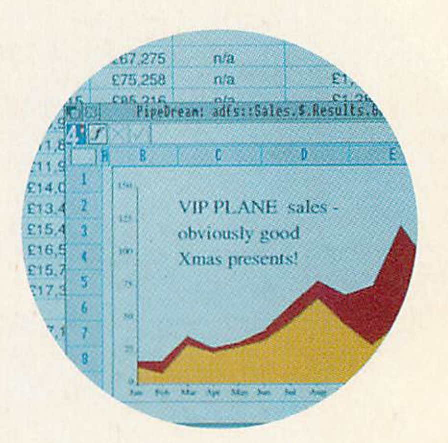
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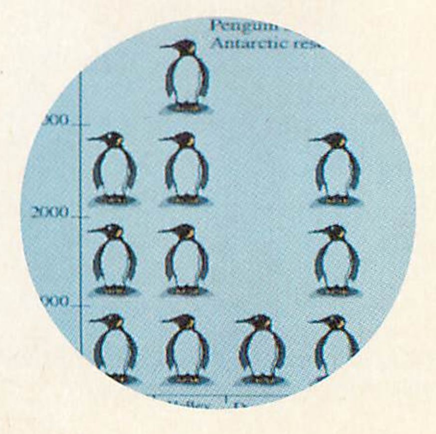
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ISSUE 113



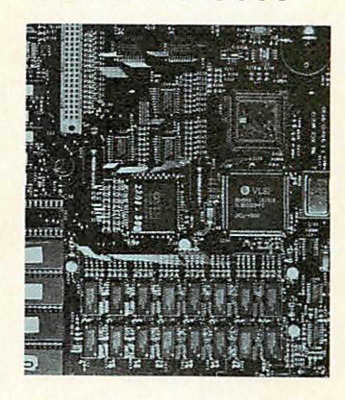
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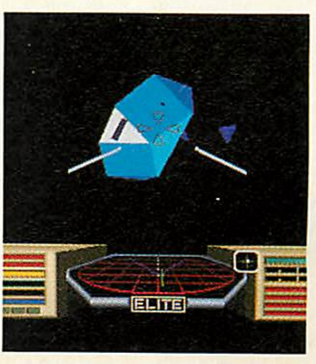
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Thinking IDE?

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If you're planning to buy IDE, here are a few questions you might like to throw at your supplier.

Do you have A3000 internal hard disc upgrades in stock?

Can I fit your interface to my A310 without a backplane?

Can I add a second hard disc to your system without having to buy another case and power supply?

Will you give me an update to a second generation of software very soon, at a nominal cost?

Will my hard disc come with a
**** FREE COPY OF COMPRESSION***
by Computer Concepts if I buy from you? (It makes hard discs seem a lot bigger).

If the answers are yes, you must be talking to us already.



There's only one Original



**While stocks last*



Ian Copestake Software
Dept ACU25, 10 Frost drive, WIRRAL, Merseyside, L61 4XL
Tel: 051-632 1234   Fax: 051-632 3434

E&OE SO39 91OC23



NEW LAUNCHES ATTRACT RECORD CROWDS TO SHOW

A RECORD number of visitors flocked to the recent *BBC Acorn User* Show to see a host of new products being launched from all corners of the Acorn marketplace.

Over 10,000 people passed through the turnstiles of the Wembley Conference Centre over the show weekend in October. The attendance was well up on last year, exceeding even the optimistic expectations of the organisers, Safesell Exhibitions. Long queues formed on the Saturday as a result of capacity, controlled by Wembley fire regulations, being reached by mid-morning.



VISITORS FLOCK TO THE STANDS AT THE SHOW

Acorn's new A5000 machine proved to be a crowd puller, but even Acorn was taken aback by the public's response to the product. Sales of the A5000 at the show exceeded initial supplies and further lorry loads had to be ordered from Cambridge. Even so, not all of the orders could be met on site, with Acorn claiming to have sold its entire production run of A5000s until the end of the year. (See the letter from Acorn's managing director, Sam Wauchope, on page 25 for more details).


CAROL VORDERMAN VISITS

Other exhibitors were equally taken aback by the attendance figures. Some admitted to running out of stock before the end of the first day, with tales of vans being despatched urgently to collect further supplies for the rest of the show. For many companies, the show was an opportunity to demonstrate forthcoming software and hardware. With most of the new products aimed at the Archimedes and A3000 (there was very little new for eight-bit BBC micro users to feast their eyes on) it was obvious from that 32-bit is dominating the Acorn marketplace.

All areas of Acorn computing, from education to graphics, were on show. Most notably, there were more games than ever, due mainly to the increasing number of Archimedes in the marketplace, which is stirring the major games houses into producing versions of popular games for Arc users.


YOUNGER VISITORS TRY THE LATEST GAMES AT THE SHOW



A5000 IS DEMONSTRATED

SHOWSTOPPERS

THE BAU Show was a hive of activity and there were a number of show-stopping products and activities. Top of the list has to be the new Acorn A5000. It was generally agreed by both exhibitors and public alike that the company has launched a winner (see review page 138)... Arm3 upgrades for the A3000 caused a stir, with versions from Atomwide/Aleph One and Watford. The latter version, at less than £200, caused a Atomwide to cut its price (see review page 145)... New games proliferated, with Elite for the Archimedes and Lemmings being shifted by the ton... Computer Concepts scored with its new Artworks graphics package and 256 grey-scale scanner... Mike Beecher from Electromusic Research scored a hit with his non-stop Karaoke demo... Iota's neatly designed Image overhead scanner and supporting software created much interest... The lads from The Serial Port achieved previously unheard of volume levels with their keyboard set-up, attracting the crowds and causing massive sales of earplugs among other exhibitors... Pres proved that you can do some serious business on the Arc with MicroTrader... Clares 10th anniversary celebration was no illusion with Illusionist... Longman Logotron went straight to the point with the excellent PinPoint database package... Ace Computing were demonstrating their new Einstein design and animation package... Risc Developments launched the DeskEdit package... ESM's Desktop Folio helped the young newshounds to produce a show newsletters... Minerva's showed its diversity with package ranging from PrimeArt for primary schools to GraphBox Professional for business users... The show theatre was constantly busy, with standing room only for most of the presentations... Visitors in need of some helpful advice kept BAU's experts busy on the First Steps clinic... Celebrities Carol Vorderman, Fatima Whitbread and other sporting personalities made sure no autograph book went unsigned. Despite rumours, Fatima did not hurl her javelin at the revolving acorn... and finally, BAU's editor, Barry Monk, respectfully declined one request for a subscription to Micro User!

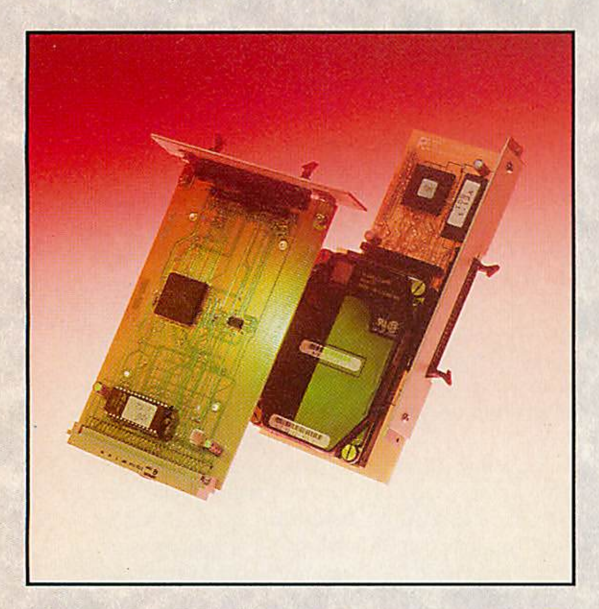
IDE Hard Disc Upgrades
for the Archimedes & A3000

SPECIAL OFFER
A3000 Internal Drive
Now Only
£195 + Vat

What is IDE?
IDE (Integrated Drive Electronics) is the latest interface standard for connecting hard drives to personal computers and is used in the new Acorn A5000. Our drives all feature a memory cache system, which when coupled with our custom designed 16 bit interface give very fast access times indeed. Typically 50% faster than the Acorn ST506 drives used on the 300 & 400/1 ranges.

What drive options are available?
Archimedes 310, 440, 400/1 and 540.
Drive sizes currently available are 42, 89 and 105 Mbyte with a typical access time of 28ms for the 42Mb models and less than 20ms for the others.
These 3.5" drives are available as either internal or external units, and use our high speed 16 bit IDE interface card that fits in your podule backplane. External drives are attractively cased to match the computer and have their own internal power supply and fan. One interface card may be used to control both an internal and an external drive.

A3000
Our A3000 external solutions consist of the 16 bit IDE podule in a special metal podule box which fits to the back of your A3000 (under the monitor stand). Drive sizes are 42 Mb, 89 Mb or 105 Mb. We are also able to offer internal IDE drives for the A3000 that fit into the internal podule slot. These special 2.5" drives are available in 20, 42 and 89 Mb formats and have access times of 23ms.





Hard Cards
These are 2.5 inch hard drives mounted onto our interface card for fitting into a standard podule slot in a 310, 400 or 540 computer. They are particularly useful when you already have one internal hard drive and want another.

What does the future hold?
IDE is a relatively new interface standard, but has already gained massive support. It has been endorsed by Acorn in the A5000 and is clearly the way ahead for users of Acorn systems. The next few months will see drives up to 400Mbyte, with larger capacities, and devices such as tape-streamers following very soon. The future for IDE is very bright indeed.

Quality
You may have total confidence in our products. Only the best drives from recognised manufacturers are used, Conner, Seagate, NEC etc. All drive kits are supplied with full fitting instructions and a user guide to ensure that you will have no problems at all. Our interface conforms fully with Acorn's IDEFS specification.

Money Back Guarantee
If for any reason you are dissatisfied with one of these products we offer a full 14 days money back no quibble guarantee.

	Internal		External	
Description	**Stock Code**	**Price**	**Stock Code**	**Price**
Archimedes 42 Mb	*5251*	*£259.00*	*5261*	*£349.00*
Archimedes 89 Mb	*5252*	*£379.00*	*5262*	*£469.00*
Archimedes 105 Mb	*5253*	*£459.00*	*5263*	*£549.00*
Hard Card 42 Mb	*5291*	*£495.00*		
Hard Card 89 Mb	*5292*	*£695.00*		
A3000 20 Mb	*5270*	*£195.00*	*N/A*	------
A3000 42 Mb	*5271*	*£495.00*	*5281*	*£359.00*
A3000 89 Mb	*5272*	*£695.00*	*5282*	*£479.00*
A3000 105 Mb	*N/A*	------	*5283*	*£559.00*

All prices include High Speed IDE Drive Interface, Manual & Fitting Instructions.

All prices are Ex VAT

Available from your local dealer, or directly from RISC Developments (please add £9 carriage).



RISC Developments Ltd is an associated company of BEEBUG Ltd.

RISC Developments Ltd, 117 Hatfield Road, St. Albans, Herts AL1 4JS
Tel. (0727) 40303 Fax. (0727) 860263

This advertisement was produced entirely with Ovation DTP from BEEBUG



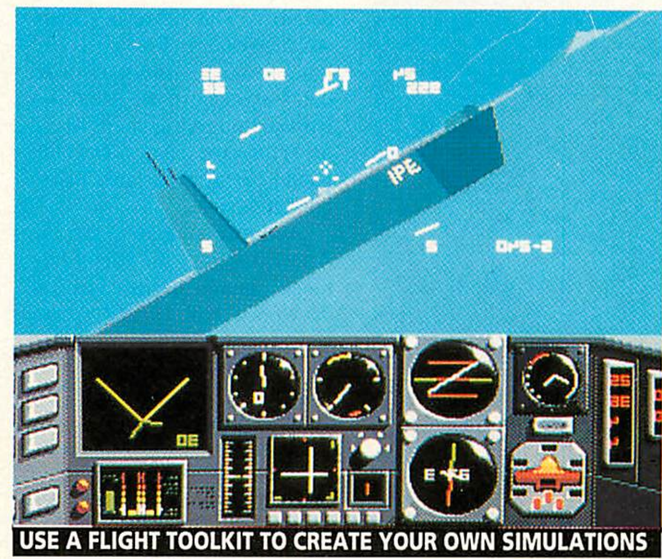
CREATE A CUSTOMISED FLIGHT SIMULATION SYSTEM ON THE ARC

SIMIS, the company responsible for creating the Interdictor and Mig flight simulation packages, is releasing a DIY flight simulation toolkit for the Archimedes.

The toolkit is designed to run in Risc Os windows is is based on the tools that were used to create Interdictor. By using the toolkit you can create your own scenarios, aircraft and targets. The main components of the toolkit are:

- A ground editor, used to define scenarios, including details such as roads, rivers, railways lines, and so on
- A 3D shape editor, used to define the objects (aircraft, trucks, cars, and so on) that are to be included in each scene. This component is also used to define the aircraft's shape
- An aircraft model editor, used to define the flight characteristics of the aircraft
- A cockpit editor, which enables the positioning and animation of the cockpit instruments within a sprite-based instrument panel.

All of these components are tied together by a simulation framework, which enables the user to fly the aircraft around the scenario created.


USE A FLIGHT TOOLKIT TO CREATE YOUR OWN SIMULATIONS

The package comes with a library of predefined shapes and aircraft models, ranging from a Cessna to a Tornado.

Chris Tubbs of Simis said: 'The net result of all this is that you can now design your own alternate realities and explore them in any type of aircraft that you want. Or, if you are a pilot already, you can create a facsimile of your base airfield and a model of the aircraft you normally fly and do some flying hours in your living room.'

The toolkit is expected to retail at around £45 and will run on the Archimedes and A3000. Contact Simis Ltd, 26 Chitty's Walk, Guildford, Surrey GU3 3HW for further details on the package.

EAGLE HAS LANDED

HIGH resolution, full motion video in the Risc OS desktop is the result of a new product from Wild Vision.

The Eagle M1 takes a video source, from a camera or VCR, and displays a real-time image in a window. The image is high-resolution, full-colour YUV version of the live video output and may be combined with computer-generated page layouts incorporating text and graphics, or overlaid onto a second video using a genlock and overlay card. A software application, *Aquila*, is also provided to support manipulation of the live image and video source.

The M1 can also be used as a high-performance digitiser, similar in effect to the company's Hawk V9. The latter has just been reduced in price to £199 ex VAT.

The Eagle M1 costs £874 ex VAT. For further information, contact Wild Vision Ltd, 15 Witney Way, Boldon Business Park, Boldon Colliery, Tyne & Wear NE35 9PE. Tel: 091-519 1455.

MIXING AND MATCHING

A NEW 'Matchmaker' interface, which permits various input devices to be connected to the Archimedes, has been released by SRS Systems.

The interface – which plugs directly into the keyboard input port of the computer – allows the connection of any switch device. This includes single switches, mice, tracker balls and programmable keyboards such as the Concept Keyboard. Switch inputting can also be made via an infra-red remote control unit.

Matchmaker costs £850 ex VAT and is available from: SRS Systems, Unit 6, Benacre Drive, Fazeley Street, Birmingham. Tel: 021-643 2877.

GRAPHIC CELEBRATIONS

CLARES is celebrating its 10 years in business in the Acorn marketplace with a number of new products for the Archimedes/A3000.

Illusionist is a powerful 3D graphics package enabling you to create an object of any colour and texture, illuminate it with coloured lights and render it in any 256-colour mode.

A special colour mixing algorithm enables *Illusionist* to display an 'infinite' number of colours, giving the impression of expensive graphics hardware. Features include a 3D editor, material editor, picture and environment mapping, anti-aliasing and saving in compressed or clear formats. *Illusionist* costs £99.95.

Version 1.18 of *Schema*, the company's top-selling spreadsheet, has many enhancements and 'corrects' some things which many users found difficult in the previous version. Updated discs will be sent to current users upon receipt of their registration.

ScoreDraw and *VoxBox* are new programs designed to complement the *Rhapsody 2* music program. *ScoreDraw* accepts a *Rhapsody 2* score and converts it into a draw file to allows a professional-looking score to be printed. *VoxBox* allows the user to create and modify voices for use with any sound package. Contact Clares, Middlewich Road, Northwich, Cheshire.

BETTER RESOLUTION

WATFORD Electronics has introduced two VIDC enhancer boards to improve the resolution of VGA and multisync monitors used with the Archimedes.

The plug-in boards eliminate the need to adjust horizontal and vertical positions when screen modes are changed. The hardware design lets the accompanying software control the polarity of both horizontal and vertical syncs, allowing display of all standard modes. Modes can also be modified and new modes designed. An additional crystal allows higher screen resolutions.

The SuperVGA and Multisync boards cost £45 and £25 respectively. Contact Watford Electronics, 250 Lower High Street, Watford WD1 2AN.



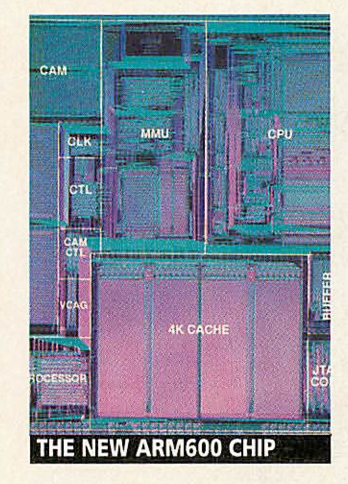
NEW ARM CHIPS WILL BE BUILDING BLOCKS FOR FUTURE ARCHIMEDES

ADVANCED Risc Machines, the chip-design company formed last year by Acorn, Apple and VLSI, has announced its first new range of chips. And Apple will use the latest, the Arm600, in a forthcoming product.

Arm600 is an Arm3-like chip with major new features. It has a full 32-bit program counter, replacing the 26-bit counter used in Arm chips to date. This will allow the new chip to address much more memory.

A write-back buffer speeds up processing by allowing store instructions to be cached, and written to memory whenever convenient. The 4k read cache remains the same as Arm3. And the chip is static – it can be virtually turned off to conserve battery power.

The biggest innovation is a new memory manager, built on the chip. Like the separate MemC, currently used by Acorn, it controls access to the memory array, but the new Arm600 chip is expressly designed to meet Apple's needs for a new object-orientated operating system.



THE NEW ARM600 CHIP

Apple's Larry Tesler confirmed that Apple will use the new Arm600 in a new product, although he declined to give details. The Arm's main advantages are low cost and low power consumption, so don't expect it to be used in a workstation. A far more likely use for the Arm600 chip would be for a portable mass-market device.

Acorn is unlikely to use the Arm600. But the 'building block' approach Arm Ltd has developed will benefit Acorn soon. Chip development is now much faster and more responsive to the needs of system software.

Malcolm Bird, Acorn's technical director, confirmed that Acorn and Arm are already developing the next series of Arm chips for future Acorn computers.

Robin Saxby, managing director of Arm Ltd, said that he hoped that the new Arm chip would become 'the Z80 of the 1990s.'

NETWORK HITS THE HEADLINES

'JUST look what the Archimedes can do! It can emulate the BBC, it can emulate the PC and run several Dos programs, it can run Unix in a separate window *and* it can access Econet and tell you what's for lunch. And, what's more, all at the same time.'

These enthusiastic words, were spoken by Christopher Dawkins, head of computing at Felsted Public School in Essex. They appeared on the computer page of *The Guardian* October 17, in a lead item about their school's computer networking system.

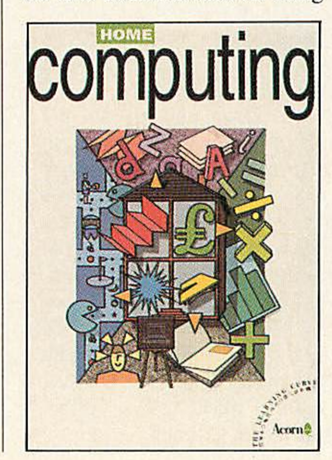
The report showed how the school's Econet system is being used as a communication system for pupils and staff alike.

Each pupil has his own electronic mailbox and information, ranging from who is in the hockey team to what is on the lunch menu, is displayed on monitors conveniently placed around the school.

BAU PRODUCES NEW PRODUCT DIRECTORY AND MAGAZINE

THE TEAM that brings you *BBC Acorn User* every month has now produced two new publications on behalf of Acorn Computers.

Purchasers of Acorn's new A3000 and A5000 Learning Curve package will find inside a free magazine called *Home Computing with the Learning Curve.* This 68-page full-colour magazine gives practical and useful advice on using Acorn computers generally, and the Learning Curve in particular. It includes a First Steps section for beginners, an Applications section showing how to make the best use of the LC applications, and a Homework section which covers software ranging from business applications to games. The magazine was written and edited by *BAU* experts and was produced using Impression DTP on the Archimedes.



The second publication, *The Product Directory* is a 192-page collection of software and hardware products for the Archimedes/A3000. There are details on products ranging from educational packages to hardware peripherals. Copies of the directory are free to Learning Curve purchasers and are also available from your nearest Acorn dealer. Contact Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN.

NEWS IN BRIEF

● **WATFORD** Electronics is holding another of its popular open days on Sunday December 1 from 10am to 4pm. Among the various hardware and software products will be the company's new Arm3 upgrade for the A3000.

Experts from various organisations, including BBC Acorn User, will be on hand to answer your technical queries and a special educational area will be provided.

The open day will be held at Jessa House, 250 Lower High Street, Watford WD1 2AN. Tel: (0923) 37774.

● **ORION** Computers has moved to its new showroom premises at 250 Leyland Lane, Leyland, Preston, Lancs PR5 3HL. Tel: (0772) 623000.

● **OOPS** time. In last month's education column we wrote about EMR's new Karaoke package, but in the screen shot caption we credited the package to Hybrid. Sorry to both companies and to readers for the mix-up – we got too carried away singing Cliff Richard's Greatest Hits!

Contact EMR, 14 Mount Close, Wickford, Essex SS11 8HG.

● **SERIOUS** Statistical Software has just released a junior version of its advanced statistical system, First. Called FirstJr, the new product will appeal to the education sector and new users of statistical methods for data analysis.

The package costs £49, with a school site licence available for £140. Contact SSS, Lynwood, Benty Heath Lane, Willaston, South Wirral L64 1SD. Tel: 051-327 4268.

● **ESM** has produced a special insert for this month's BBC Acorn User with details of the new Christmas Theme pack for its Desktop Folio package.

The pack costs £35 plus £2.50 for p & p and is available from ESM, Dept 17, Duke Street, Wisbech PE13 2AE.

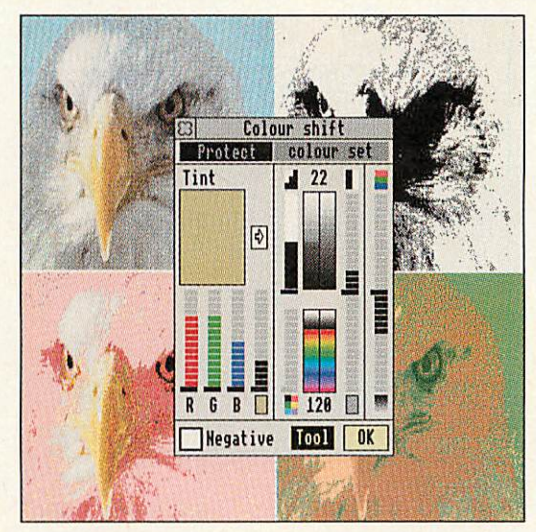
● **COMPANIES** in the Acorn marketplace are sure to make their mark on the Computer Graphics 1991 Exhibition and Conference, which is due to take place at London's Alexandra Palace from November 5 to 7.

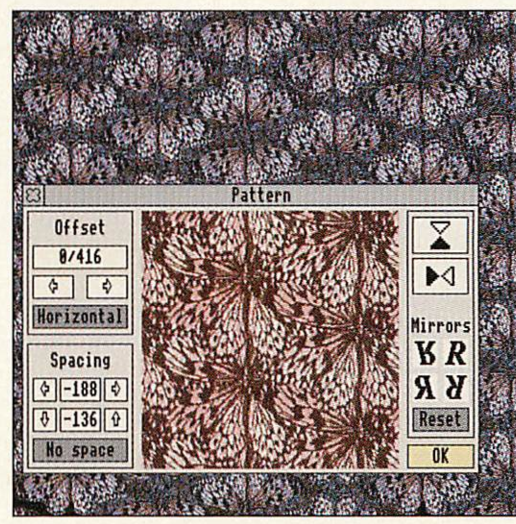
Those with their names on the exhibitors' list include Computer Concepts, Silicon Graphics and Simis. The latter company is responsible for flight simulation programs, including Interdictor 2.

Revelation 2

Revelation set the standard for bit-mapped graphics on the Acorn Archimedes. P.Clements, in Archimedes World (July '91): ***"...this package deserves to sell and sell. It's an absolute stunner."***







What will he find to say about Revelation 2? User feedback helped us create a program which satisfies the most demanding wish list. Revelation offered full RISC OS capability, with multiple images, new views and cut and paste between images.

Schools loved the way novices could quickly learn to use the powerful painting and drawing facilities; while experienced users were constantly discovering new capabilities. It's all still there in Revelation 2, *plus*

- Improved colour processing, operating on one colour or a set of colours selected from the palette;
- Additional fill options: linear and radial graduated fills;
- New drawing tools, including triangle, parallelogram, polygon and curve; variable line thicknesses; and rounded, mitred or chamfered joins;
- Improved Zoom: *out* and *in*.

Together with a host of other detailed additions to enhance profesional and educational work in art, design, electronic photography and image analysis.

Prices

Revelation 2 £119.00 single user

Revelation £76.00 protected

Upgrade to Revelation 2 £43.00

Revelation 2 Site Licence £400



LONGMAN LOGOTRON

124 Cambridge Science Park
Milton Road
Cambridge CB4 4ZS

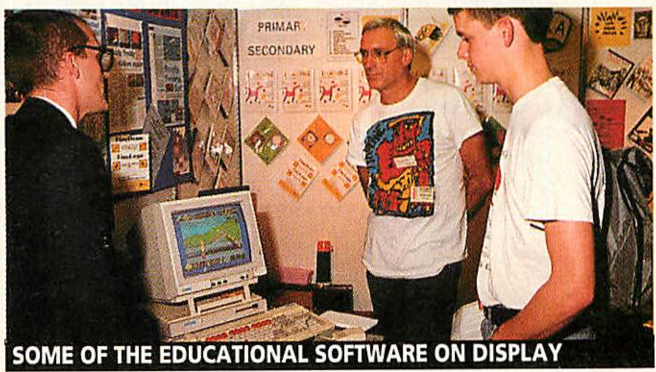
Telephone: (0223) 425558
Fax: (0223) 425349



SHOWING OFF ONCE AGAIN

THERE were record attendances at this year's *BAU* show, the venue of many new releases. Minerva was demonstrating *PrimeArt* (£79.95), its newly released art package for primary schools and our young newshounds were kept busy producing a daily newsletter on ESM's *Desktop Folio*.

ESM also released its *Christmas Theme Pack* (£35), which contains over 310 festive pictures. This is the first in a planned series of ESM support packs for the Arc – so watch this space.



SOME OF THE EDUCATIONAL SOFTWARE ON DISPLAY

To complement *Rhapsody 2* Clares launched two new programs; *ScoreDraw* which converts *Rhapsody 2* scores into draw files, and *VoxBox*, a suite of programs which modifies voices for use with any sound or music package. Both programs cost £53.

Datahandling plays a major role in the National Curriculum, and two databases which aim to make it simpler for children and adults are Longman Logotron's new educational database *Pinpoint* (£99), and Sherston Software's *Recall* (£39.95).

FLYING HIGH AS A KITE

LONGMAN LOGOTRON and BBC Enterprises joined forces to produce *Skyhunter*, the latest title in the BBC Look and Read series. The television programmes will be broadcast in January, but meanwhile pupils can make the acquaintance of Butch, Jackie and Trevor through the software title of the same name.

It is aimed at seven to nine-year-olds who help catch the crooks who are selling birds of prey illegally. There are 12 chapters in the story, each with a puzzle to solve, such as piecing together a torn map, or searching for word rhymes.

The program is designed to be followed in sequence, but the menu facility allows users to take up where they left off. Children stuck on a particular aspect can leave it and continue with the next chapter.

The manual explains the theory of each puzzle, and provides ways of extending the ideas into the classroom. Until Christmas the BBC version will cost £18 plus £2.50 p&p, and the Archimedes version, £19 plus p&p, from Longman Resources Unit, 62 Hallfield Road, Layerthorpe, York YO3 7XQ. Or phone (0223) 425558 for more details.

CHILDREN FOLLOW THE MOVEMENTS OF THE CROOK

CONTROL IT

ARC OWNERS will welcome Longman Logotron's *Control Logo*. Its language is identical to that of the earlier BBC version, but the superior speed of the Archimedes is exploited.

The addition of new keywords allows users to control and monitor external devices via the user and printer ports. A Phobox Electronics User Port Expander will connect the buffer box to the user port only, leaving the printer connected. Particularly relevant to schools is the ability to regulate power settings on outputs.

The expander costs £28 from Phobox on (0705) 269642, and Control Logo is £22, from Longman Logotron on (0223) 425558.

Montrol is a control program for the BBC B and Master from Keep IT Easy (Kite). It extends *Graphite* – a graphics and sprite generator – into the area of monitoring and control. Kite wanted a program where commands can be built up easily, using the screen effectively. As the displays and commands are decided by the user, it has potential for key stages 2, 3 and 4. For more details contact Kite at PO Box 29, Nuneaton, Warwickshire CV11 4TT.

Sharon Halpern

NEWS IN BRIEF

● **COMPUTER** generated graphics and music bring The Christmas Story to life in a new video from Bible Society.

Aimed at three to seven-year-olds, the narration is reinforced by subtitles and children are encouraged to take part as the story is repeated without words. It also includes two new Christmas songs, and the words, music and chords are provided.

The package comes with ready-to-use learning exercises, and background material that can be photocopied. It costs £14.95, from Bible Society, Stonehill Green, Westlea, Swindon, Wiltshire SN5 7DG. Tel: (0793) 51371.

● **MY FIRST WORDS** helps develop word recognition skills. It is content-free, and users create libraries of 'books' with up to four pages, 25 words per page.

It costs £29.95 plus £1.50 p&p from Cambridgeshire Software House, 7 Free Church Passage, St Ives, Cambridgeshire PE17 4AY. Tel: (0480) 67945.

● **MIX AND MATCH** your designs with 4Mation's two new art packages, Chameleon and smArt. In Chameleon, four modes of colour-changing allow colours in draw files to be changed simply. It can also provide colour separations, which are used for professional printing purposes.

The smArt Suite contains files, each of which contains a collection of objects which can be linked together and changed without leaving gaps and overlaps. A separate package, smArtFiler, allows users to construct their own smArt files using Draw.

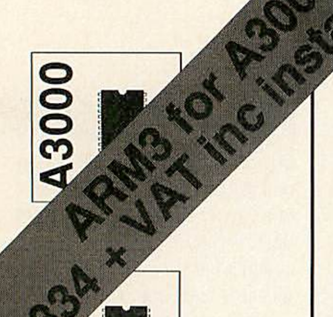
Chameleon, £25, smArt, £55, and smArtFiler, £35, for the Archimedes range, are available from 4Mation, 14 Castle Park Road, Barnstaple, Devon EX32 8PA. Tel: (0271) 25353.

● **AS ALL ARTISTS** know, it takes time to create a masterpiece. In schools, however, time is at a premium so teachers will welcome Image Discs. Each has 20 to 30 draw files on a single theme, which can be printed out or placed in most DTP or wordprocessing packages. Topics include Sikhism, Man in Space and The Vikings.

The discs cost £5 each, or £18 for four, plus £1.50 p&p, from John Beattie, 72 Kimberley Road, Leicester. Tel: (0533) 733063.

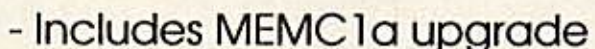
The Complete Upgrade Solution





A3000

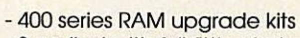
- Uses only eight RAM devices
- User upgradeable from 1 to 4 Mb
- Four layer printed circuit board
- Low power consumption
- Available without RAM devices



Bare card - £35 2nd Mb Card - £56 4th Mb Card - £159

A3

- Includes MEMC1a upgrade
- Large capacity OS ROM sockets
- No soldering required
- Four layer printed circuit boards
- Courier collection of your machine



2nd Mb - £225 4th Mb - £299

A400

- 400 series RAM upgrade kits
- Supplied with full fitting instructions
- 410/1 to 420/1 requires 1Mb
- 420/1 to 440/1 requires 2Mb
- 410/1 to 440/1 requires 3Mb

1Mb - £35 2Mb - £64 3Mb - £98

8Mb

- Uses only eight RAM devices
- Suitable for A440, A400/1 & R140
- Fully RISC OS compatible
- Four layer printed circuit boards
- Courier collection of your machine

8 Mb upgrade - £599

ARM3

- New series Aleph One ARM3
- 3 to 4 times performance increase
- Surface mount technology
- Four layer printed circuit board
- Suitable for all Acorn ARM2 based machines

ARM 3 upgrade - £285 ARM 3 for A3000's - £334

VIDC

- Increases resolution with all Multiscan monitors
- Doubles desktop work area
- Custom modes for Taxan and Eizo monitors
- Suitable for all Archimedes computers
- Free with any multiscan monitor from Atomwide

Atomwide VIDC Enhancer - £25

DISC

- Syquest removable disk systems
- Including One cartridge, drive unit and all cables
- 42Mb removable cartridges
- High-flow fan fitted for improved cooling
- Please phone for prices on other SCSI related products

Atomwide Syquest drive unit - £424 42Mb disks - £55

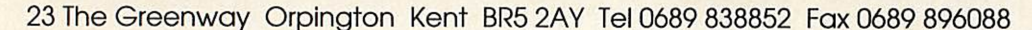


VISA

- All products are cross-compatible
- Combination deals available on all products
- Typical combination A310 4 Mb and ARM3 £559
- Dealer enquires welcome
- Phone for full details on all products

All prices exclude VAT at 17.5% but include delivery





ATOMWIDE



23 The Greenway Orpington Kent BR5 2AY Tel 0689 838852 Fax 0689 896088



MAJOR NETWORK CLOSES

THE MAJOR news this month is the closure of Prestel's biggest subscriber network; Micronet. Micronet has been a central part of Prestel since it's launch in 1983. It will be greatly missed by users of all home computers, not least Acorn owners, since the BBC computer grew up with Micronet. One of the reasons Micronet was chosen for the BBC computer literacy project was that it offered mode 7 or viewdata graphics capability, which was a key part of the BBC's original specification. Sadly, after the computer boon of the 80s, Micronet is no longer able to keep up the membership levels needed to run a successful service.

Sad, because not only did Micronet provide daily news services, technical articles plus software and hardware reviews for every popular home computer, but it also provided entertainment in the form of games and quizzes, hints and tips sections, TV, video and record reviews and became an important source of gossip and chat between thousands of users, hundreds of miles apart.

Initially, BT made an online charge for using Micronet so that, in addition to your phone bill, you were billed for the amount of time you spent online. A few months ago, after listening to subscribers' comments, BT decided to drop the time charges and increase the quarterly subscription charges. But, partly due to the recession and party due to a decreased user base, BT now feels that it cannot provide a service that the subscribers deserve and expect at an economic price.

From October 31, all Micronet accounts will be closed, although subscribers will be given the option to keep their Prestel accounts, at the normal Prestel rate, in order to gain the benefits of electronic mail and Prestel business services.

BT are also offering a free introductory membership to the vast American Compuserve network. Although this is expensive, at around £6 an hour, ex-Micronet members can obtain $25 worth of free usage, together with a temporary password and ID. Unfortunately, being a US network, it has rather limited coverage of Acorn machines within its UK forum.

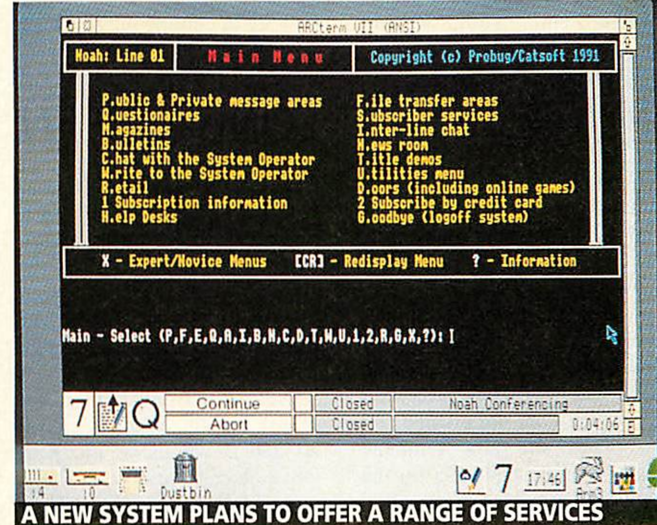
Coupled with expensive online charges, Compuserve may have little to offer the enthusiastic Acorn owner. However, as I write, I have heard rumours of a major new bulletin board service which may be launched as a very cheap replacement to Micronet. As yet, I have no fixed details, but watch this space for more news.

NEW ARCHIMEDES CONFERENCING

WITH the demise of Micronet, lots of subscribers will no doubt be looking for alternative sources of Acorn news, gossip and software. A new bulletin board and conferencing system is about to go online, which should interest people in the Bristol area.

The Noah Conferencing System will try to provide technical advice, reviews and news on all aspects of the Archimedes range. Special interest areas will also serve to entertain users on a variety of subjects from UFO's to steam-trains. It will be connected to other local, national and international conferences, so your message could be seen by thousands of users.

Another service offered is that of transmitting faxes from uploaded text files and a printing service that will print out Laserjet and Postscript files for you. With a promised 24 hour turnaround, this could be an easy method of obtaining high quality printouts if you can't afford a laser printer of your own. Online entertainment will be provided and, as four lines are planned, users will be able to interact with other subscribers. There is no fixed subscription fee yet, but residential rates will be about £14 per annum– pretty good value by any standards.



A NEW SYSTEM PLANS TO OFFER A RANGE OF SERVICES

The system will run on a 33MHz 486 PC and will cope with all speeds up to V22bis with MNP-5, V42 and V42bis. (An extra line will be used to support V32, V32bis and HST connections.)

If you want to try the prototype board, ring Noah Conferencing System (0454) 316109, with your comms software set to scrolling, 8N1.

NEWS IN BRIEF

● **VISITORS** to the BBC Acorn User show will have seen that Beebug has the long-awaited Hearsay 2 almost ready for shipping. In fact, as you read this, the first orders are being despatched.

Not only does the new version expand on many of the original features, but it is now fully multi-tasking within the Risc OS desktop and includes an extremely comprehensive script language, which is similar in many ways to the programming language C++

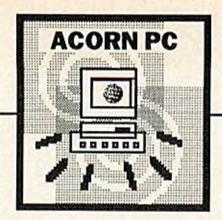
● **BY THE** end of the year, Computer Concepts Archimedes fax podule should be readily available. They have just announced the specification and prices. Both look amazingly good – it will feature full 9600bps fax operations with fall back to 7200, 4800 and 2400, compatible with all group 3 fax machines.

Being on a half-width podule with multi-tasking software, FaxPack will allow you to send any file as a fax, as easily as dropping it on to a printer driver. It will also receive fax messages in the background, so as not to interrupt normal usage of your Archimedes. Received faxes can then be pasted directly into Risc OS applications. This could almost be the birth of the paperless fax machine. FaxPack is fully BABT approved and will be priced at around £300.

● **WITH** the advent of high speed comms at a competitive price, we could soon see the arrival of some impressive online games in the UK. One London based company, called Online, has just imported a major game called Air Warrior from the US.

Using custom-written software on your computer at home, you can compete against other players in a multi-user flight simulation. Each computer will have its own software to handle graphics, but will transmit vital data such as plane co-ordinates to other users. Watch this column for more news on the game.

● **AND** now its plug time! Another bulletin board dedicated for Acorn Users is on 0255 503048. Called Viking East Anglia, it has lots of Beeb-orientated areas and information. I shall cover it in more detail in a future column, but if you want to try it out, you can do so with your comms software set to Viewdata, 1200/75 speed.

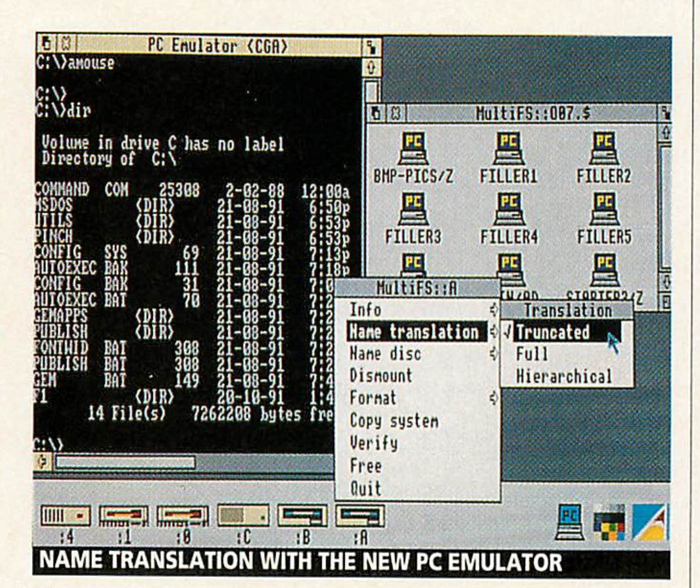


WINDOW OPPORTUNITIES

WITH THE new PC emulator, we're looking at a PC, based on the 80188 chip, complete with a maths co-processor. This is a basic specification and performance is still slow. On an Arm2 machine, with real-life situations, it runs rather slower than a 4.77MHz 8088-based PC.

Assuming the whole PC-emulating Archimedes world doesn't go out and buy an A5000 or Arm3 upgrade, where does this leave us? We now have an emulator which does everything that the old program does, but will also do it in a Risc OS window. This reveals several opportunities, particularly for transferring files and screens between the two systems. It's now possible to grab PC screens as sprites or text files and transfer them easily to the native system.

This is made even easier by the inclusion of Arxe Systems *MultiFS*, with a few new bells and whistles added for good measure. Key advantages include three different ways of handling MS-Dos filenames, including Arxe's original 'folder for each filetype' technique. Other improvements include the ability to format bootable 360K and 720K MS-Dos discs, and a menu option to remove the MS-Dos disc icons from the icon bar.



NAME TRANSLATION WITH THE NEW PC EMULATOR

The new emulator shows no real speed increase over the older version, so you're left considering text-only applications on an Arm2 machine. Text applications probably still form the majority of PC programs, and wordprocessors and databases can be run at useable speeds.

With the addition of an Arm3 chip, now down to a more reasonable price with the release of the new Watford upgrade, processor-intensive programs and graphics become an option. For real PC enthusiasts on the Archimedes though, the only real answer will be the long-mooted hardware PC podule. These won't be long in coming.

ON-SCREEN TEMPLATES

IN BOTH Archimedes and PC applications, functions can be assigned to function keys. However, it can be irritating having to constantly swap the function key templates when you swap programs.

Solving this problem is a handy utility called *F1*, which is simply a pop-up, on-screen function key template. The program comes on a single 3.5in disc and neatly installs itself in the F1 directory which it creates. Once in place, it is called up by typing in its name. It will sit out of the way until you load a program for which it has a pre-defined template, of which there are 20.

It is then possible to bring up a template over the bottom three lines of the screen by pressing Ctrl-Alt-F1. Different templates are defined by the function keys, on their own and in combination with Shift, Ctrl and Alt.

A utility called *EditF1* lets you edit pre-defined templates and create your own. Editing and saving new templates with the editor is straightforward and, once they are created, *F1* associates the new template with the executable file for the application and recognises it automatically each time it is run. This is a great utility, although at £49.95 it is not cheap, even for a PC program.

Incidentally, there is also a Risc Os equivalent, in the form of Ian Copestake's *QuicKey*. For more details on *F1*, contact TraQs on (0753) 582020. *QuicKey* is available by calling 051-632 1234.

LONG SCREEN

ONE OF the major restrictions when using the PC-emulator is the need for a higher resolution than that provided by the Acorn/Philips monitor, supplied with most machines. The Risc OS window, through which it displays the EGA screen, shows only 50 percent of the length. You can scroll up and down using the Risc OS slide bar, but this isn't perfect. Ideally, you would be able to switch between emulation modes, using CGA for text-mode programs and EGA for graphics.

However, this is not possible and the only real answer, as always, is a monetary one – buy a multi-scanning monitor which can support the higher resolution Archimedes modes.

Simon Williams

NEWS IN BRIEF

● **CLIP ART FOR** the PC Emulator and Archimedes (via Translator) is available from Softcell Services. The clip art has been conveniently catalogued separately, so you don't have to wade through pages of PD and shareware to find what you want. Most files are in PC Paintbrush (PCX) format, and will work with many PC paint programs as well as translating. Each 3.5in disc of clip art costs £2.50 and you can contact Softcell on (0443) 238630.

● **THE CANON BJ10E** inkjet printer continues to be adopted widely, and is very often badged by other companies as their own. If you shop around, you can now pick one up for under £200. Computers by Post on 081-760 0014 and Hi-Voltage on 081-686 6362 are two sources. With jet black print and near laser quality type, the Canon BJ10E must be one of the bargains of the year.

● **IT'S AMAZING** what can be done with an MS-Dos batch file as Van Wolverton's book, Supercharging MS-Dos, from Microsoft Press (ISBN 0 914845 95 0), shows. It's full of all kinds of wangles and good ideas and, although it's not new, it will be £17.95 well spent.

● **FROMBAT** from Clockwork Software takes standard batch files and converts them to stand-alone executable COM files. These run faster and nobody can see what's in them. A number of new commands and structures have also been added to the rather rudimentary MS-Dos batch file language, giving scope for fancy intro text on-screen and menus in installation programs.

As both interpreter and compiler are supplied, you can develop under either system. At £82.25 it's almost a full language in itself. Contact Clockwork Software on (0705) 483217.

● **ON THE SUBJECT** of PC Emulators; speed can be traded off against resolution and colour palette. If you select a CGA monochrome display for graphics applications, the speed of screen redraw is just about useable. If you then go for the graphics applications, designed to work with base-level PCs, you should come to a workable compromise. Programs such as Timeworks Publisher and Dr Halo work at reasonable speed on the Archimedes emulator.



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Our popular Stepping Up series continues with a look at database packages available for the A3000 and Archimedes

SECONDHAND BEEBS

With many Acorn users upgrading to Arcs, the market for secondhand BBC micros has never been so good. Read our guide to buying a used Beeb

ILLUSIONIST

Clares has just released its long-awaited graphics package, *Illusionist*. We put it through its paces

Watch out for the January issue of BAU – available December 12 1991

PLUS

RISC OS 3

Following on from our review of the new Acorn A5000, we take a closer look at the new operating system, Risc OS 3

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5725b	Data Word (Triple R)	16.12
1008b	Desk Top Stories (Resource)	32.95
0935b	Dread Dragon Droom	25.95
5705b	Fun School III (5-7 years)	21.27
5706b	Fun School III (7+ years)	21.27
5704b	Fun School III (under 5)	21.27
5726b	Money Matters (Triple R)	16.12
5727b	Picture Book (Triple R)	16.12
5729b	Target Maths (Triple R)	16.12

Books

There is no VAT to pay on books

1252d	A5000 Tech Ref Manual	65.00
1211b	Arch Assembly Language	14.95
1246b	Archimedes First Steps	9.95
1243c	Arch Operating System	14.95
1208b	Basic V : A Dabhand Guide	9.95
1230b	Desktop Dev.Environ. Guide	25.00
1245e	RISCOS Prog. Ref. Manual	79.00
1225b	RISC OS Style Guide	9.95
1207c	30 Hour Basic	12.95

Communications

3110g	Amstrad SM2400 Modem	189.00
0779g	Linnet Modem	119.11
0101c	Hearsay II Comms Software	75.00

Monitors

0189g	Acorn Colour Monitor	199.95
0527g	Microvitec CUB3000	195.70
0506g	Taxan 775 MultiSync	389.00

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0375b	1Mb - 10 in Library case	6.77
0676b	1Mb - 40 in Lockable box	27.19
0674b	Hi-Density 1.6mb - 10 in Case	15.28



JOYSTICK CONTROLLERS

Connect an Amiga or Atari Joystick such as the Deluxe Quickshot to your Archimedes. Simply plugs on to the in Centronics printer port of your Archimedes.

Joystick Controller (code 0722b) £22.00
Quickshot Turbo Joystick (code 4084c) £10.20

Matrix Printers

0379g	Epson LQ400	168.00
0329g	Epson LQ550	238.26
0327g	Epson LQ860	564.00
0378g	Epson LX400	122.00
0322g	Epson LX850	178.60
0382g	Epson LQ870	430.00
0471g	Star LC20	119.95
0337g	Star LC24-10	195.00
0436g	Star LC200	185.00
0404g	Star LC24-200 Mono	228.95
0402g	Star LC24-200 Colour	264.95
0477g	Star ZA-200	282.00
0478g	Star ZA-250	354.00
0472g	Star XB24-200	354.00
0473g	Star XB24-250	426.00



Inkjet Printers

0430g	Canon BJ-10ex (Black case)	215.00
0431g	Canon BJ-10ex (White case)	215.00
0464g	HP DeskJet 500	350.00
0442g	StarJet SJ-48	209.00

Laser Printers

0496g	Laser Direct Qume (CC)	949.00
7501g	Laser Direct Hi-Res 4	950.00
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7541g	Star StarScript 4	839.00
0480g	Star LaserPrinter 8 II	1050.00
0483g	Star StarScript 8	1299.00

Amstrad SM2400 Modem plus the new state-of-the-art Hearsay II Software

The highly acclaimed Amstrad SM2400 modem has been re-released by Amstrad. It is a full feature Hayes compatible modem operating at speed of up to 2400 baud.

Hearsay II is the brand new RISC OS compliant communications package for the Archimedes.

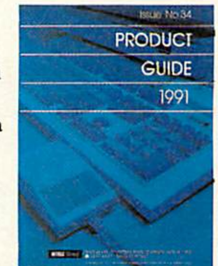
The package comprises the Amstrad SM2400 modem, Hearsay II and a custom cable to connect the modem to the computer.

Stock Code 3114g Price £189.00

All prices exclude VAT

Beebug is an Acorn Premier Dealer and has been involved with Acorn products for over 9 years. We pride ourselves on our after sales service. As one of Acorn's largest retailers you can rely on us for support for many years to come.

If you are interested in buying an Acorn computer, or if you already own one and wish for a comprehensive selection of the best products available why not have a look in our glossy 72-page full colour product guide.



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BEEBUG CHRISTMAS OPEN DAY

Beebug is staging another of its popular open days at its large premises in St Albans. A number of visiting companies, including Acorn will be demonstrating their latest products. You could even pick up a bargain for Chrismas!

Sunday 8th December 1991
10am - 4pm

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As with previous years Beebug will do its utmost to fulfil all orders before Christmas. All orders received up to Thursday the 19th December will be dispatched in time for Christmas (subject to items being in stock and postal services).

ORDERING INFORMATION

All prices exclude VAT. We accept Access Visa, Switch, Connect cards and cheques drawn on UK Banks. Orders from education and PLC's are most welcome. 80% of all orders are dispatched within 24 hours, but allow up to 28 days for goods which are out of stock. An acknowledgement of order is sent by return if goods are out of stock. All prices and specifications subject to change without notice. E&OE

Product Code	UK, BFPO & Channel Islands *(P&P)*.
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b	*£2.00*
c	*£3.10*
d	*£3.60*
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g	*£9.00 Courier - mainland UK only*

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RISC User offers 10 magazines a year which typically contain:



News on the world of Archimedes
Reviews of the latest products
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Utilities, routines and advanced programming techniques
Programs and articles on sound and graphics
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- 'Mastering the Wimp' — series on Wimp programming
- 'Under the Lid' — hardware series
- 'Assembler Workshop' — all about ARM Assembler
- 'Beginning 'C' — series on C language
- 'DTP/WP' — advice on using commercial software
- 'Arcade' — a round-up of the latest games

Hints and tips
Postbag for your letters and answers to your questions
Technical queries and expert answers

Magazine discs, containing all programs published in the magazine plus some additional items, are available to order or on subscription.

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The only significant magazine still dedicated entirely to users of the BBC Model B and Master series.

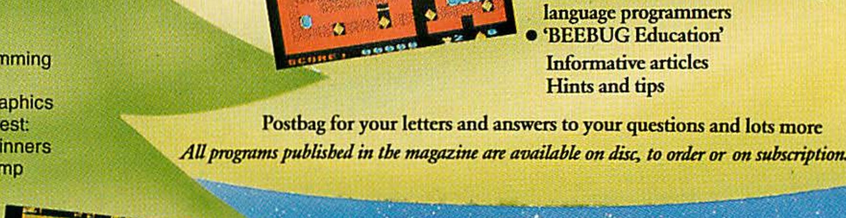
FREE! GAMES DISC
- Chinese Chequers
- Twiddles
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In April, BEEBUG commences its 10th year of publication, providing professional, useful and interesting information to thousands of subscribers. Each magazine offers:

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- Handy utilities and useful routines
- Entertaining games

News from the BBC world
Reviews of new products, and comparative surveys



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£15 STAR LETTER

I read with interest the recent review of the Ecosampler from the Serial Port, (*BAU* September 91) especially noting the fact that the Serial Port are working on a solution to bypass the Archimedes audio filter circuitry, to improve the sound quality gained from the external audio socket.

I have been using my own A3000 for about eight months with a small modification I made to obtain an unfiltered audio output. I have not encountered any problems so far. The modification, in the form of a new audio out socket takes only a few minutes and involves no soldering inside the machine.

Three spring-loaded probe clips (Maplin FE16S) are used for the connections inside the machine. Connect one to any earth point, for example the headphone socket or composite video socket, to provide the common ground. The other two clips, audio left and right, should be connected to the southern end of R99 and the southern end of R86.

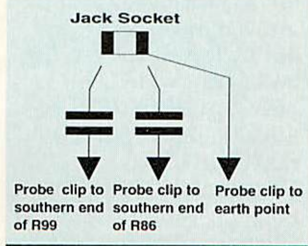
I brought the three wires out of the machine and into a box containing a ¼in jack socket and two 680nF DC blocking capacitors (Maplin WW51F) needed for the two positive connections.

This modification simply takes the sound out after integration of the raw output of the VIDC but before anti-aliasing and filtering has taken place. The two DC blocking capacitors are needed as at the point in the circuit where the sound is taken out, the audio signal is superimposed on to a 2V amplifying current, so without the two capacitors the power supply may be strained.

The new audio output will not drive headphones but can be connected to an amplifier or hi-fi. A graphic equaliser can be used to further enhance the sound which now includes higher frequency partials so that cymbals and drums sound better and sound tracker tunes sound the same as when they are played on the Amoeba.

C M Bristow
Dunvant
Swansea

If you are not sure of your ability to make this modification then ask your dealer.



AUDIO CONNECTION

SHOW STOPPER

As I'm sure you will all be aware by now, the *BBC Acorn User* show was a great success with over 10,000 people visiting the show over three days.

The new A5000 was undoubtedly the star of the show and throughout the event we ran an A5000 learning curve special offer. Its success went way beyond our expectations and I would like to apologise to those of you who were disappointed that you were not able to leave the show with your new machine.

However, the good news is that all who took advantage of the offer should be getting their A5000s very shortly. The early success of the A5000 is testament to the fact that we have an excellent product to offer you, which admirably complements the entire range of Acorn computers. I hope you are already as excited by the A5000 as we are.

Certainly, the response we have been getting from the many third parties who support Acorn through their software products, as well as from our dealers and distributors, has been excellent and I am certain that this can only result in yet more and better products for you, the customers of Acorn equipment.

Sam Wauchope
Managing Director
Acorn Computers Ltd



THE NEW A5000 LEARNING CURVE

DAY OF THE CD-ROM

Way back in 1987 the Domesday LV-Rom format discs were released for the Master 128. At the time it was a most innovative product and it still is. I understand that each of the discs stored approximately 324Mb of data, though I could be wrong about this.

I see a potential market for Acorn and the BBC, if these were revised so that they were suitable for CD-Rom format (660Mb per disc) and could be used on 32-bit Acorn machines. If priced correctly, they would provide an incentive for people to purchase an Archimedes with CD-Rom and may stimulate the use of this media on the Arc. In CD-Rom format they would at least get a wider audience.

A price of £50 per disc would be accessible to most people with a computer and I for one would be very interested in purchasing a set as source material and for general interest.

Victor Markwart
Wanniassa
Australia

DOSSING AROUND

In most of the Acorn-related computer magazines it has been stated that in order to create Dos batch/config.sys/Ascii files it is necessary to have an Ascii editor such as *Edlin* or *PC Tools Deluxe Wordprocessor*. However, this is not the case.

As on the Arc, a file can be copied to the printer, serial port or a file. In fact MS-Dos can do all this and more. In MS-Dos, all of the above are known as devices, except that the format would be

COPY <DEVICE> <DEVICE>. For example. COPY A:*.* C: copies everything on drive A (the floppy drive) to drive C (either a hard drive or Ram disc.) This is similar to the Arc *COPY command, except that Dos devices are named as follows – A: B: C: and so on, for drives; PRN for the printer; COM1 or COM2 for the serial ports and CON for the keyboard or screen.

The last one, CON,is very useful. As well as the obvious COPY Readme.Txt CON used to read a text file, the command can also be used the other way round, copying console input to files. For example:

```
COPY CON AUTOEXEC.BAT
copy *.EXE d:
d:
pcshell
```

This is followed by CTRL-Z then RETURN to close the file. This example would create a simple autoexec.bat file.
Here is another example:

```
COPY con Readme.txt
Hi Fred!
Here are the files, see you soon!
Bob
```

For those having to struggle with the comparatively primitive Dos, these methods may help with the barrier between it and Risc OS.

Neil Carson
Abingdon
Oxfordshire

SEARCH PARTY?

Is there a database available so that I can search for a specific article or review in past issues of *BBC Acorn User*?

Naomi Leeke
Camberwell
London

Keep an eye out over the following months. The database you have been waiting for is on its way.



QUESTIONS AND ANSWERS

Q I believe that it is possible to buy books containing clip art and decorative borders that can be scanned into the computer and then used, without breaking any copyright law. Is this true, and what are they called?

Von Smith
Hanwell

A There are a number of such books available. *The Artfile* series from Phaidon Press, the *Clip Art* series by Dover Publications, and *The Hinwood Library of Ideas* are just a few examples of copyright-free artwork that can be scanned and used in desk top publishing.

***The Artfile* series is available from Bookpoint on (0235) 835001, *The Hinwood Library of Ideas* from Appletree Cottage on (0428) 604573 and the *Clip Art* series from the Dover Bookshop on 071-836 2111.**

Q I have been experiencing problems with my Archimedes 310 locking up. I believe that this is being caused by mains spikes. However, my friend suggested that it may be because I have too many podules fitted into my machine. He might be right as everything works when I remove all the podules. Whatever the cause, it is making the computer very difficult to use. Please help.

A G Mothersole
Hanworth

A The power supply in an Archimedes should be able to cope with a full complement of expansion podules, which are either full or half width.

Your machine is fitted with a respected back plane, and has no record of power problems of the nature you describe, therefore the fault does not lie in this area.

As the computer works with the podules removed, this could indicate that the power supply is not functioning properly; perhaps it is reaching the end of its serviceable life. Therefore have your PSU thoroughly checked by an Acorn dealer. It is not a question of it being overloaded, but rather a question of a fault leading to the transcients.

Q After typing in the *Page-Mak* program which you recently published in your magazine, I find that I cannot get it to run properly on my Acorn Electron, although the article did infer that it was Electron compatible.

I know that my listings are right as the program runs properly on the BBC Master 128 at school. Can you advise me on what I may be doing wrong?

D L Tremayne
South Norwood

A Our technical expert advises that the program will run on your Acorn Electron if, before you run the first program, you raise PAGE by &600.

Q I have recently acquired a Pace Nightingale modem that I want to use with my A3000 which has had a Serial Port add-on installed. I realise that to use this modem, or indeed any modem, I will need to purchase a communications package. Can you advise me on what I will need.

Ewen Roberts
Littlethorpe, Leicester

A One of the most commonly used of the comms packages for the Archimedes is *ArcTerm7* priced at £68 and available from The Serial Port who can be contacted on (0373) 824200. It is a comprehensive terminal providing unparalleled flexibility with a good viewdata mode.

Another package is *Hearsay*, £60, from Beebug on (0727) 40303. This is easy to use as it takes full advantage of the Wimp environment, and it provides extensive emulations of all the terminals you should ever need.

***Hearsay* is well supported, and has a number of built-in modem drivers. These include the latest Pace Linnet modem.**

A cheaper alternative is available from David Pilling Software on (0253) 852806. David markets a package called *Risc OS Desktop Multi-tasking Terminals* for just £5.95 which allows access to Prestel, bulletin boards and mainframes. None of the comms packages directly support the Pace Nightingale modem, but *Hearsay* does work with most modems, without too much difficulty. Beebug may even have developed a driver for it.

Q Why is the keyboard lead to the system box so short on the Archimedes? I could do with a much longer lead. Does anyone make them?

Ken Bolt
Hammersmith

A Keyboard extenders are available for the Archimedes from Videk, Unit 10, Bowman Trading Estate, Westmoreland Road, Kingsbury, London NW9 9RN. They cost £7.95 plus £1.50 p&p. These cables are actually the same ones that are used on the Apple Mac and IBM PS/2.

Q I recently purchased an A3000 which I use with a Bush Premier 14in colour television. Unfortunately I am experiencing difficulties with the production of the computer's image on the screen. I can't seem to get in to the centre of the display.

S J Millard
Persondy, Abercarn

A Most television sets have a horizontal centring device, fitted on the front panel of the television or at the rear. It has an icon of a screen within a screen, with the second screen set slightly off centre. However, on some modern sets this knob is replaced by a series of small holes. These are used for fine tuning with the special plastic tool provided.

If there is no external arrangement for adjustment, the casing will have to be removed. Do not attempt to undertake this kind of work yourself, but instead arrange for your dealer to adjust it for you.

Alternatively, the flaw could be in the A3000, or a faulty part in the video cir-

READER SERVICES

Last month saw the final reader service in its present format, at least for the time being. However, we still plan to answer your queries within the limits of these pages. You are invited to send in your questions, whether technical or otherwise, to:

Questions and Answers
BBC Acorn User
20-26 Brunswick Place
London, N1 6DJ.

If you send a disc, please mark your name and address on the disc itself. Also include full details of your machine. Please enclose an SAE where necessary and mark your envelope eight or 32-bit Acorn machine.

cuitry could be causing the computer image to be offset. As your computer is new it is suggested that you consult your dealer.

Q I am a games playing Archimedes owner and would like to use a joy stick with my *Zap Them* program. Can you tell me whether there are any joystick interfaces available that would enable me to use an Atari-type joystick with my Arc?

Simon Armite
Weston

A There are at least two different joystick interfaces which allow users to connect standard Atari-type joysticks to an Archimedes. These also provide the necessary software support, enabling players to use the joysticks in games.

The interface marketed by The Serial Port, tel: (0373) 824200, plugs into the parallel printer port, while the RTFM interface is fitted inside the computer, in the socket that would hold the Econet interface if you had one. Therefore, the RTFM interface will not suitable if you already have an Econet fitted. RTFM can be contacted at 43 Hill Street, St Helier, Jersey.

Q I recently bought an Archimedes, a Laser-Direct printer and Computer Concept's package, *Impression*, and I am all set to get into DTP in a big way. However, I would like to get hold of some background material that will explain the terminology and give me a few ideas regarding the theories behind layout and design. Can you recommend a few introductory books on the subject of desk top publishing?

Alan White
Teddington

A Two useful books are Rob Pickering's *DTP at a Glance* (ISBN 1 85550 002 7) published by Bookmark Publishing, and John Miles' *Design for Desktop Publishing* (ISBN 0 86092 096 8) published by Fraser Gordon. Both are well-written and simple to understand, and the latter should certainly give you a good introduction to page layout.

Q Do you know whether anyone is developing optical character recognition (OCR) software for the Archimedes range?

I have been impressed by the packages currently available for the Apple Mac computer and the Acorn 32-bit range could certainly do with something similar.

Bob Vernall
Hayes

A Irlam Instruments who developed the first colour scanner for the Archimedes, have an OCR system up and running. It is called *Elucidata* and it converts monochrome sprites into text files. The system can cope with a wide range of different fonts and costs £159. Call Irlam on (0895) 811401.

Q I have access to an IBM PC/compatible and Laserjet printer at the office. I am want to transfer files that I have created using *Draw*, *Paint* and *Edit* for printing on the Laserjet. Is it possible and what software will I need?

Wayne Waterson
London

A The task you have set yourself is definitely possible, although you will have to convert your *Draw* and *Paint* files to PC graphic format before printing.

It is suggested that you purchase a copy of *MultiFS* which is published by Arxe Systems, PO Box 898, Forest Gate, London E7 9HJ. This will enable you to format suitable discs that can then be read on your Compaq and used to transfer the data directly on to your own Risc OS desktop. The package also comes with the excellent *Translator* application. This can be used to convert files to and from formats such as Giff and Tiff. It also has specific utilities that make Giff and Tiff files and some text conversion utilities.

ACORN CUSTOMER HOTLINE

● It has been brought to our attention that the notify facilities, provided by the Network filing system under Risc OS, can cause major headaches for teachers.The ability to send messages from one machine to another is a useful facility for a Network Manager to have. However, when this privilege is extended to network users it soon becomes apparent that it can be open for abuse.

As it has been some time since this information was last published I think, from the number of enquiries we are receiving on the subject, that it is worth mentioning again. It is possible to protect the computers against receiving the notify messages. Go into Basic, by pressing F12 then typing *BASIC, then use the following call to turn on your computer protection:

SYS &4000E, &10, %100011111

To turn the protection off, use:

SYS &4000E, 0, %100001111

Attempting to send a message to a protected station will now produce the following error message: 'Station ### not listening'. Systems that are running as Level 4 file-servers automatically protect themselves from being notified. Therefore, if Level 4 is running in a multi-tasking mode the server cannot be stopped.

It should be noted that the notify facility has been removed from Risc OS 3, fitted in the A5000.

● Acorn will be discontinuing SID, the Support Information Database, for general usage from the end of October. However, it will remain open for dealers, ASCs and educational users until a replacement system can be set up.

There is no longer access to SID from Prestel, Micronet or from Fastrak. Instead all registered users will need to dial the PSTN number, (0223) 243642. This number has three lines supporting v21/22/22bis/23 modem speeds.

For end-users, Acorn is centering its support on the Archimedes Echo on Fidonet. This is a conference area where users can read and write messages, which are then passed around to all the other boards that 'take' the Archimedes Echo.

There are also a number of Acorn Support Areas on selected bulletin boards which contain Acorn proprietary software such as printer drivers and modules. These cover application notes, hints & tips and news. They are regionally placed to provide maximum coverage. To find out more about Acorn's involvement in Fidonet, call the bulletin board nearest to you. These are as follows:

Arcade London: 081-654-2212 or 081-655 4412
TUG-II Droitwich: (0905) 775191
Enigma Droitwich: (0905) 795002
ICON Dublin: 010-3531 971660
The Power House Malpas, Cheshire: (0829) 782676
DarcWorld Oxford: (0867) 577724
Noah Bristol: (0272) 572322
Odyssey Beverley: (0482) 870919
Star-Net Norwich: (0603) 507216
Norfolk School Net Scottish Opus Glasgow: 041-880 7845 or on 041-880 7863

You will need to set your comms software for Ansi display, 8 data bits, 1 stop bit, and no parity. Most speeds up to 9600 HST are supported. You will also need to register with the system, which incidentally is free, before you can access the Acorn Support Area. Download the file in the hints & tips area called ArcGuide. The file is in plain text.

● A number of people are experiencing problems when printing A3 size from Draw. It is necessary to remember to set your printer driver up to an A3 page size before starting to print from Draw. Draw will take the page setting from the printer driver loaded. Using the Show option, from the Paper Limits submenu on the Misc submenu within Draw, it is possible to see the page size that Draw is currently set to and is using from the printer driver. Showing the paper limits will also show you how close to the edge of the page you can draw without going into the unprinted margin.

● If you have any enquiries regarding an Acorn product please try talking to your nearest dealer in the first instance. I am sure that they will be willing to help. However, if you still need to contact Acorn, please try to avoid 'phoning. We would prefer people to write to the customer service at Acorn Computers, Customer Services, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN.

PRES

AT THE FOREFRONT OF A3000 UPGRADES



Monitor Stand
Probably the best monitor stand available for the A3000 and the sturdy basis of your modular system.

System Housing
When you are ready to expand the A3000 this system housing is placed over the monitor stand, allowing two floppy drives and hard drives to be added with ease.

Expansion Card Case
If you're adding an expansion card (or podule) to your A3000 then you will need this case to connect and protect it.

Podule Expansion System
Allows two podules to be added to your A3000, and be working alongside each other simultaneously.

Disc Buffer
The definitive expansion for people that wish to add extra floppy drives. Support for 40 and 80 tracks. Will also allow you to add SCSI. We are continuously working on other options.

65Host 1770 DFS and DFS Filer
A Rom upgrade for the Disc Buffer that provides a DFS drive icon on the icon bar and 1770 DFS in 65Host, the BBC Emulator.

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MICRO TRADER, PROFESSIONAL ACCOUNTS SYSTEM
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Fast data transfer between linked Archimedes. At 10 million bits per second.
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THE SPACE KIT
Allows 400 series owners to fit a second internal hard drive.
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NEW PRODUCT ..... A3K4 DOUBLE PODULE EXPANSION

Now you can add a second standard eurocard podule to your A3000. Fully integrated with the PRES expansion system – no soldering required, no timing problems, no large box bolted around your computer, simply 'plug in and expand' ... (requires A3K3 expansion card case). Remember A3K6 also allows for an extra internal card; giving a total of ... 4 expansion cards in your A3000

PRES Ltd, Box 319, Lightwater, Surrey, GU18 5PW
Tel. 0276 72046 • Fax 0276 51427

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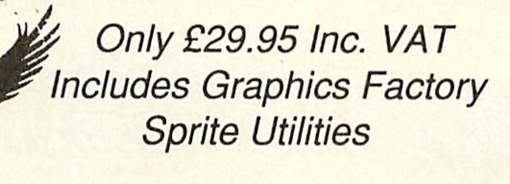
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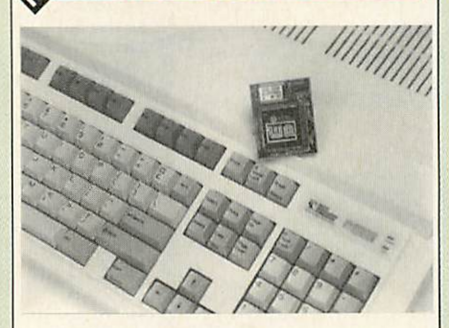
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NEW ARM 3 Turbo Card



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £199. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £35.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

Special Price £249

All our A3000 ARM 3 upgrades are fitted by Acorn approved Board level & surface mount technology Service Centre

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For Archimedes IDE Hard Disc turn to page 14

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Watford Electronics are inviting Hardware and Software engineers to apply for positions in their new R & D team. Hardware engineers must be familiar with the Archimedes architecture and able to follow a project from conception to production. Software engineers should be proficient in ARM assembler or Acorn C, and able to write RISC OS applications and module code. Applicants should be well motivated and show experience in relevant areas. Qualifications are not as essential as your ability to produce innovative solutions to challenging problems. As a new member of the team you will be in a unique position to develop your career in a rewarding environment.
In the first instance forward your CV to Shiraz Jessa or Chris Honey.

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A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs.

Features
- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

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Offer Price: £399

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ULTIMUM – Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

The accepted standard for Archimedes computer expansion is the Acorn Podule, designed initially to fit the old 310, and also for the later A400 and A400/1 series micros. The podules fit inside these computers up to four at a time. The A3000 is the little brother of the family, but can only have one podule at a time, plugging into the back of the computer.

Other attempts have been made to expand the A3000 by trying to introduce a 'mini-podule'. This is impractical for many reasons, amongst which is the reluctance of manufacturers to produce them. Nobody wants to re-design podules already produced. Some cannot be produced on a 'mini-podule' as they are far too complicated and simply wouldn't fit.

Watford Electronics listens to the demands and requirements of its customers, and we are glad to say that we have come up with the only real solution to the A3000 expansion problem. The ULTIMUM Podule Racking System allows up to three FULL SIZE standard Archimedes 300/400 series podules to be fitted to the computer. In addition, there is also provision for a hard disc drive and a podule to be fitted internally.

Since the ULTIMUM Podule Racking System takes proper full size podules, you will be able to use any of the currently available peripheral equipment, from companies like Computer Concepts, Armadillo, Acorn and of course, our own brand.

Fitting the podules to 'ULTIMUM' is simple. They are neatly fitted inside the metal case of the rack, avoiding the previously untidy method of hanging the podule off the back of the computer, risking damage to both, it and to the computer.

'ULTIMUM' has its own power supply, so no strain is put on the A3000 power supply. There is also an IEC mains output socket for an Acorn type monitor so reducing the number of plugs required to go to the mains. The ULTIMUM is rigidly clamped over the top and under the computer, and allows direct access to the floppy disc drive and reset button, rather than obstructing access as on other systems. The mounting method employed is so firm that the computer could even be safely transported without the assembly falling apart.

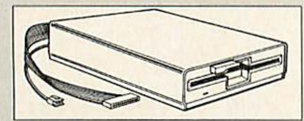
Price: £125

Continued→ → → → → → → → → →

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399**

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

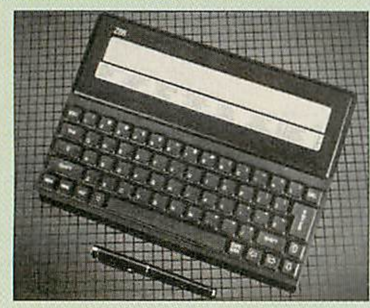
Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during November

Add-Ons & Accessories

Econet Module for the Master	**£45**
Twin ROM Cartridge for Master	**£9**
Quad ROM Cartridge for Master	**£14**
Master Reference Manual I	(No VAT) **£14**
Master Reference Manual II	(No VAT) **£14**
Master Advance Ref Manual	(No VAT) **£17**
64K Upgrade Kit for B+	**£32**
Acorn 1772 DFS Kit complete	**£49**
ECONET Upgrade Kit for BBC B	**£42**
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	**£238**
Morley Teletext Adaptor with ATS Rom	**£99**
Ecolink	**£270**

Z88 Portable Micro



£179

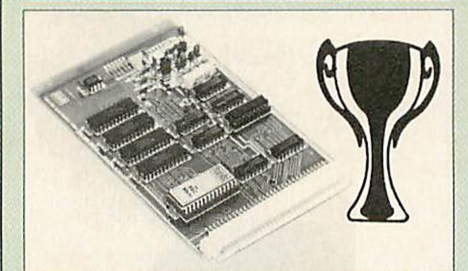
FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

• 32K RAM Pack or 32K EPROM Pack	**£16**
• 128K RAM Pack or 128K EPROM Pack	**£32**
• 512K RAM Pack	**£86**
• Z88 Eprom Eraser Unit	**£38**
• Z88 Spellmaster for Pipedream	**£40**
• Z88 Carrying Case	**£8**
• Z88 Computing Book	**£9.95**
• AA Nicad Rechargeable Battery	**£1.50**
• Battery Charger Compact & Fast	**£6**
• Z88 Serial Printer Cable	**£8**
• Z88 Parallel Printer Cable	**£18**
• Z88 to Archi Link	**£15**
• Z88 to BBC Link **£8** • Z BASE	**£56**
• Z88 to PC Link II **£27** • Z TAPE	**£42**
• Z88 to Macintosh **£32** • Z TERM	**£42**
• Z88 Mains Adaptor **£9** • Z88 Modem	**£114**

Archi Real-Time Digitiser



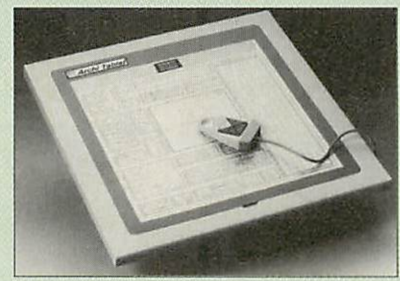
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £175

A Set of Colour Filters for colour image grabbing using a video camera	**£16**
New Risc-OS Software Upgrade	**£39**

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £199

(Price includes Tablet, Leads, Software & Puck) Stylus Optional Extra **£15**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Disc Plonker Rack



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: £2

Acorn & Watford DFSs

• Watford sophisticated DFS ROM	**£16.00**
• Watford DFS Kit complete	**£69.00**
• We will exchange your existing ROM for Watford's ultimate DFS ROM at only	**£12.00**
• DFS Manual (comprehensive)	**£6.95**
• Acorn DNFS ROM	**£17.00**
• Acorn ADFS ROM only	**£25.00**
• Acorn 1772 DFS ROM Kit	**£49.00**

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

• SPECIAL PRICE	**£44.00**
• DDFS Manual	(No VAT) **£6.95**
• We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£30.00**

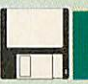
Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.



3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

• *10 x 5.25" S/S D/D 40T (744)*	***£5***
• *10 x 5.25" D/S D/D 40T (745)*	***£5***
• *10 x 5.25" S/S D/D 80 Track (746)*	***£7***
• *10 x 5.25" D/S D/D 80 Track (747)*	***£7***
• *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT*	***£9***
• *10 x 3.5" S/S D/D 40/80 Track*	***£7***
• *10 x 3.5" D/S D/D 40/80 Track*	***£7***
• *10 x 3.5" Double Sided High Density*	***£13***



Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

• *10 x* ***M3*** *3.5" D/S D/D 80 Track*	***£7***
• *10 x* ***M9*** *3.5" D/S High Density*	***£12***
• *10 x* ***M4*** *5.25" S/S D/D 40 Track*	***£5***
• *10 x* ***M5*** *5.25" D/S D/D 40 Track*	***£5***
• *10 x* ***M7*** *5.25" D/S D/D 80 Track*	***£7***
• *10 x* ***M8*** *5.25" D/S H/D Hi-Density*	***£9***
• ***M2*** *3" Double Sided*	***£2.50*** *each*



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Various UK "manufacturers" of disc drives for the BBC Micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

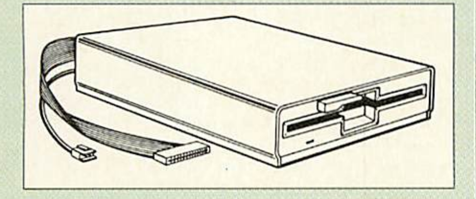
If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

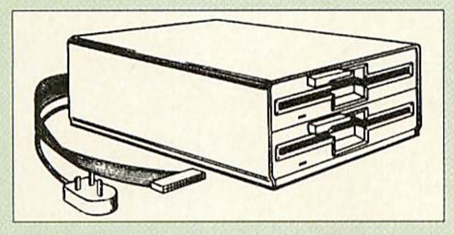
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. ***Ideal for Schools & Colleges.***

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. *(Turn to the 6th page of our advert for the Plinths).*

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"



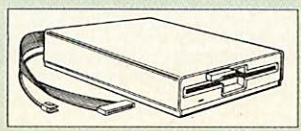


Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	**£72**
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£142**
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	**£82**
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£155**

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Disc Drive/DDFS Offer



- The popular CLS400S 40/80 track switchable disc drive.
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes.
- A comprehensive DFS Operating manual

Bargain at Only **£116** (Offer valid until stocks last)

3.5" DISC DRIVE

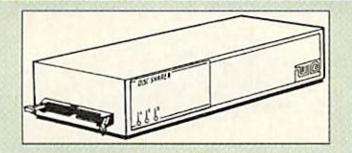


These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	**£62**
• **CLD400S:**	Twin Disc Drives, 800K	**£109**
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	**£83**
• **CD35:**	Twin Disc Drives, 800K	**£126**

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drive Sharer

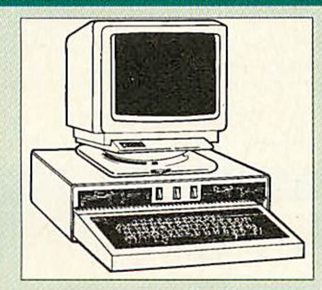


(Ideal for educational establishments)

A low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC Micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables **£55**

Disc Drives in Monitor Stand



• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

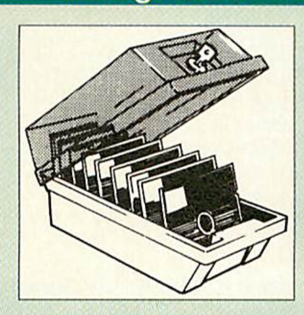
£154

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units

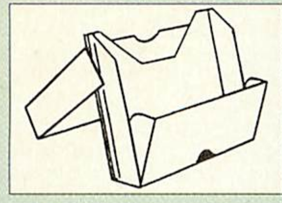


Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** – holds up to 50 5.25" discs **£4.95**
- **M85** – holds up to 95 5.25" discs **£6.95**
- **M25*** – holds up to 25 3.5" discs **£4.95**
- **M50** – holds 50 3.5" discs **£6.50**
- **M10** – holds 8 of No. 10 Data Cartridges **£15**

* Not lockable

Plastic Library Cases



Holds up to 10 x 3.5" Discs.	**£1.50**
Holds up to 10 x 5.25" Discs.	**£2.00**

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	**£3.20**
Single CS (with PSU)	**£3.25**
Twin CLD (without PSU)	**£3.85**
Twin CD (with PSU)	**£3.90**

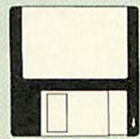
Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

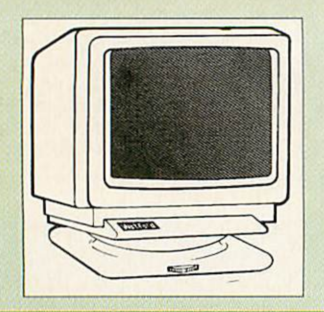




BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D		£29 for 50	£52 for 100

Continued→ → → → → → → → → →



Microvitec Monitors

- **1431** – Standard Resolution Monitor £169
- **1451** – Medium Resolution Monitor £209
- **Cub3000** Medium Res for A3000 £189
- **1441** – High Resolution Monitor £359
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• NEC 5D	£1179
• Eizo 9070S	£579	• Taxan 770LR	£370
• NEC 2A	£245	• Taxan 775	£369
• NEC 3D	£323	• Taxan 795	£405
• NEC 4D	£629	• Taxan 875	£669
• VIDC Enhancer Board			£25

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)



Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexlbility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

- **BM7502** 12" Hi-res Green Monitor £67
- **BM7522** 12" Hi-res Amber Monitor £67
- **CM8833** 14" Med. Res Colour Monitor £165
- TV Tuner for CM8833 Monitors £62

Dust Cover for Philips Monitors £6

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £163

Refurbished Monitors

Philips 14" Refurbished Colour Monitors, same specification as the 'Star Buy' Monitors above £119
(Offer valid while stocks last)

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

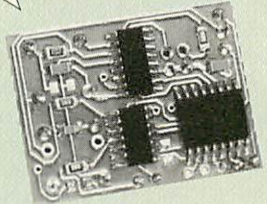
Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12



Watford VIDC Enhancer

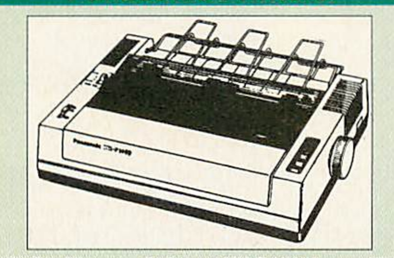


This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the new standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: This provides support for both VGA and Multisync monitors. A unique electronic design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control **£45**

MultiVideo VIDC Card: As above but for MultiScan monitors only. **£25**

Panasonic Printers



• **KX-P1123**	£144	• **KX-P1654#**	£349
• **KX-P1124i**	£194	• **KX-P1695**	£285
• **KX-P1170**	£109	• **KX-P2624#**	£359
• **KX-P1624**	£285		

Price includes 12 months On-site warranty

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175	KX-P1540 (P35)	£175
KX-1124 (P36)	£79	KX-P1180 (P37)	£66
KX-P1624/1695 (P38)	£124	KX-P1123 (P37)	£66

Buffers

P12	4K buffer Board for 1081	£55
P42	32K buffer Chip for 1592/1595	£16
P43	32K Buffer Chip for 1123/24/70/80/1540	£16

Serial Interfaces

P17 P1081/1592 £32 **P19** P1124/1180 £49

Citizen Printers

120D Plus	£96	124D Printer	£142
Prodot 9X	£245	Swift 24	£203
PN-48	£199	Swift 24X	£269
Swift 9	£134		

- Prodot Cut Sheet Feeder £120
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black **£4** Colour **£13**
- Swift 24X Cut Sheet Feeder £125
- Prodot 24 Cut Sheet Feeder £124

Integrex Colour Jet

- Colour Jet 132 Printer £499
- Paper Roll £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £21
- Black Cartridge £12.40
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123

Star Printers

- **LC15** 9pin 136col. 180/45 CPS £173
- **LC20** £110
- **LC24-10** 24pin 80col. 180/60 CPS £143
- **LC24-15** 24pin 136col. 200/67 CPS £292
- **LC-200** Colour 9pin 80col. 180/45 CPS £152
- **LC-24-200** 24pin 80col. 222/67 CPS £175
- **LC24-200** Colour 24pin 80col. 222/67 CPS £216
- **XB24-200** Colour 24pin 136col 300/100cps £306
- **XB24-250** Colour 24pin 136col 300/100cps £369
- **XB-24** Colour Kit £29
- **SJ-48** StarJet 360dpi £179
- **ZA-200** Colour 9pin 80/136col 420/84cps £239

Star Accessories

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

SPC-10 LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200 £49

8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £64

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour £29

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55

Ribbons

LC10; LC10-II; LC15	Black **£4;**	Colour **£6**
LC-200; LC24-200	Black **£5;**	Colour **£12**
XB24-10; XB24-15	Black **£5;**	Colour **£12**

Laser Printers

All Laser Printers include 12 months On-site maintenance

• Canon LBP-4	4ppm	£569
• Canon LBP-8 III	8ppm	£975
• Canon LBP-8 IIIR	8ppm	£1479
• Canon LBP-8 IIIT	8ppm	£1365
• Epson EPL4100	6ppm	£595
• Epson EPL7500	6ppm	£1179
• HP Laserjet III	8ppm	£1019
• HP Laserjet IIID	8ppm	£1715
• HP Laserjet IIIP	4ppm	£689
• HP Laserjet IIISi	4ppm	£2425
• HP Laserjet IIIsi	16ppm	£2475
• Panasonic KX-P4420	8ppm*	£629
• Panasonic KX-P4450i*	11ppm*	£1015
• Panasonic KX-4455 Postscript	11ppm*	£1528
• Star LP-8 II (2 Bin)	8ppm	£1195
• Star LP-8 III	8ppm	£936
• Star LP-8 Star(post)script	8ppm	£1159
• Star LP-4	4ppm	£619
• Star LP-4PS Postscript	4ppm	£815

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	KX-P4420/50	£19
Epson GQ	£13	Laserjet HP IIP & IIIP	£42
EPL7100	£82	Laserjet II/D, III/D	£48
Star LP-8	£56	Qume Crystal	£58

Laser RAM Upgrades

• IIP & III 1MB	£56	• EPL7100 256K	£39
• IIP & III 2MB	£88	• GQ5000 512K	£42
• II & IID 1MB	£64	• KX4420/50 1M	£75
• II & IID 2MB	£99	• KX4420/50 2M	£115
• II & IID 4MB	£146	• KX4420/50 4M	£195
• Canon LBP4 1M	£105	• Star LP8 1M	£139
• Canon LBP8 2M	£125	• Star LP8 2M	£275

Laser Drum & Developer

• Epson Drum GQ5000	£93	EPL7100	£129
• Panasonic 4420 Drum	£60	Developer	£59
• Panasonic 4450 Drum	£93	Developer	£80
• Qume Drum	£76	Developer	£56

Jetpage Postscript Cartridge

• HP IIP/III £239 IID & IIID £240

Various Add-Ons

Laserjet Appletalk Interface	£139
HP Adobe Postscript	£399
Jetpage Postscript for Laserjet 2	£235
Jetpage Postscript for HP 2P/3	£229
Pacific Page Postscript	£259
HP Premier Font Collection	£28
Jetfont Superset for II & IID	£129
JF Superset International for IIP & III	£145

Hewlett-Packard Printers

• # Desk Jet 500	£285	• Paintjet XL	£1065
• Desk Jet 500 Col.	£499	• Quiet Jet Plus	£384
• Desk Jet Cartridge	£15	• HP Think Jet	£285
• Paint Jet Colour	£454	• Rugged Writer	£925

Now 3 years extended Parts & Labour warranty

- Paintjet Cartridges Black £19; Colour £25
- Desk Jet 500 256K RAM cartridge £129
- HP Epson FX Emulation Cartridge for Desk Jet £59

HP Apple Talk Interfaces for
- Scan Jet £299 • Paint Jet £POA
- Desk Jet Unlimited (Book No VAT) £19.75

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10EX	£184	£43		£16
BJ300	£320	£88	£65	£12
BJ330	£374	£110	£79	£12

- Spare Battery pack for BJ10E £33

NEC Pinwriter Printers

• P20	£179	• P70	£405
• P30	£217	• P90	£599
• P60	£345		

Cut Sheet Feeders

P20 **£59**; P30 **£75**; P60 **£85**; P70 **£129**

Epson Printers

DFX5000	£1059	LQ870	£372
DFX8000	£1985	LQ1060 Colour	£609
FX850	£272	LQ1070	£325
FX1050	£346	LQ1170	£449
FX1060	£595	LQ2550+	£685
LQ400	£156	LX400	£105
LQ450	£175	LX850	£146
LQ550	£204	SQ850	£436
LQ570	£215	SQ2550	£635
LQ850+	£399		
LQ860 Colour	£459		

Cut Sheet Feeders for

LX400/800/850/LQ400/500/550 **£69**
EX800/FX800/850/LQ800/850 **£130**
FX/LQ 1000/1050/SQ850 **£159**
LQ 2550 **£390** SQ2550 **£390**

Tractor Feed for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

- EX800/1000 Colour Option **£45**
- EX800/1000 Colour Ribbon **£14**
- LQ2500 Colour Option **£65**
- Multifont Card for LQ550/850/1050 **£95**

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232 **£28** RS232 + 2K Buffer **£52**

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£4
IBM/Archimedes Parallel Lead 5 metres	£10
IBM/Archimedes Parallel Lead 10 metres	£15
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.
IBM Keyboard extension lead coiled	£5

Concept Keyboards

Standard A3 Keyboard with BBC Software	£143
Standard A4 Keyboard with BBC Software	£117
Archi A3 Keyboard	£144
Archi A4 Keyboard	£118

Plotters

• HP7440A	£415	• HP7475A	£592

Roland Plotters

• DXY1100	£499	• DXY1200	£629
• DXY1300	£830	• DXY2500	£2349
• DPX3500	£3289	• Sketchmate	£315

- Roland plotter Pens, Fibre tip £7.50

Listing Paper (Perforated)

• 1,000 Sheets 9.5" x 11" Fanfold Paper	£7
• 2,000 Sheets 9.5" x 11" Fanfold Paper	£11
• 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	£21
• 1,000 Sheets 15" x 11" Fanfold Paper	£9
• 2,000 Sheets 15" x 11" Fanfold Paper	£16
• 1,000 Sheets true A4 Fanfold Paper 70gms	£11
• 2,000 Sheets true A4 Fanfold Paper 70gms	£21
• Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£6.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

Laser Printer Labels on A4 Sheets

3750 70 x 29mm (3 Rows)	£13.50
3000 70 x 37mm (3 Rows)	£13.25
2625 70 x 42mm (3 Rows)	£13.00

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
DMP4000	£3.75	£4.85
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86/800/850	£2.75	£4.50
LX400	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£3.25	£4.75
Panasonic KX-P1124	£7.00	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet Cartridges (set of 4)	£6	

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595 **£6**
P115 for KX-P1180 **£7** **P145** for KX-P1124 **£7**
P140 for KX-P1540 **£8** **P155** for KX-P1624 **£8**

Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red **£9 each**

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£10	£11
• 3 to 1	£13	£14
• 5 to 1	£16	£17

Professional Type

Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa.
Centronics **£18;** Serial **£17**
(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Parallel
2 to 1	£40	£45
4 to 1	£62	£59
8 to 1	–	£89

256k Multi Spooler

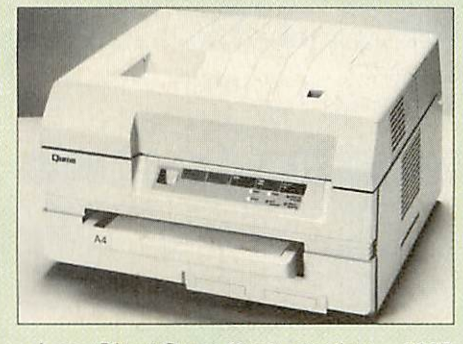
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out **£135** • 4 In/2 out **£169**
- 8 In/1 out **£199**

Compact Converter Units

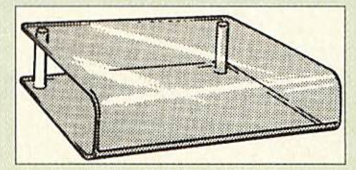
Serial to Parallel **£36** Parallel to Serial **£37**

Laser Direct



- Laser Direct Qume 6ppm complete **£825**
- Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers **£325**
- LPB 4 Printer plus High Res Card **£899**
- LPB 8III Printer plus High Res Card **£1299**

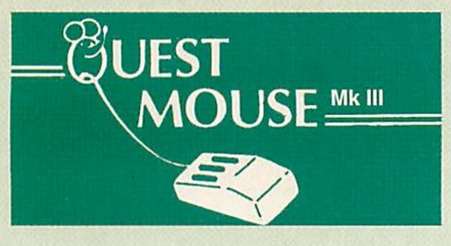
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version **£16** (carr £3)
136 Column version **£20** (carr £4)

Continued→ → → → → → → → → →



- Quest Mouse III & Quest Paint £59
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse III only £30
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software



Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

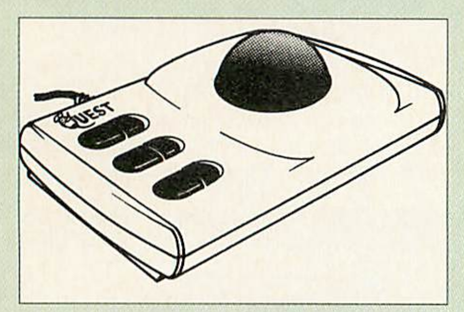
ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £32

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version **£27**
QT-20 Archimedes Version **£30**

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible) £45
RB2 including Quest Paint £75
RB2-A for Archimedes £46

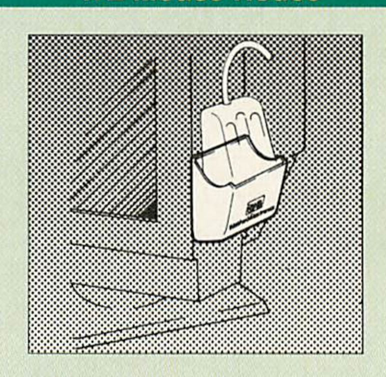
THE NEW Mk III AMX MOUSE

- **AMX Mouse plus Super Art £54**

(Please specify for BBC, Master or Compact)

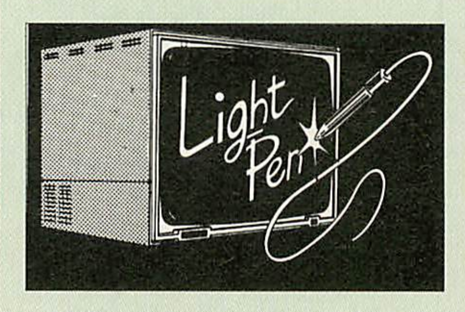
- AMX MOUSE ONLY **£29**
- AMX SUPERART Package **£29**
- AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse **£25**
- PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker **£13**
- AMX DESIGN (ROM) **£34**
- AMX XAM Educational **£15**
- AMX EXTRA EXTRA **£16**
- AMX MAX A gem of desktop (ROM) **£20**
- MOUSE MAT **£3**

WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £3



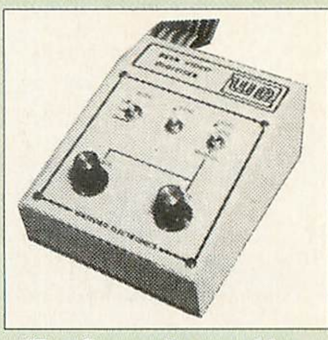
Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £19

Fleet Street Editor

Software pack for BBC Micro **£29**
Software pack for the Master **£35**
Fonts N Graphics Disc Utility **£13**

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

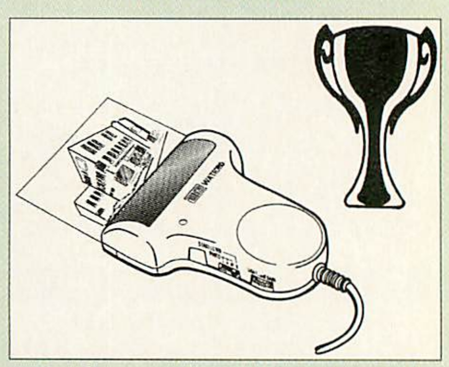
£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

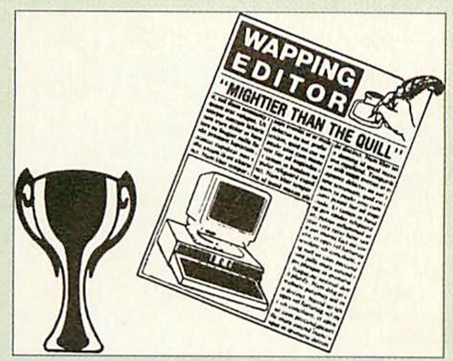
The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.
The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.
All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware **£135**



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£59**
Wapping Editor plus Mouse	**£79**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner



This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs.
The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.
Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.
All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

New Low Prices:

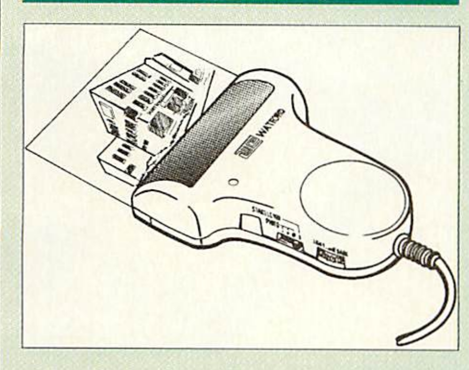
Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419

(Dealers Inquiry welcome)

Computer Concept Scanlight

• Scan-Light A4	£375
• Scan-Light A4 + Sheet Feeder	£475
• Scan-Light Junior mono	£178
• Scan-Light Junior 256	£215

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

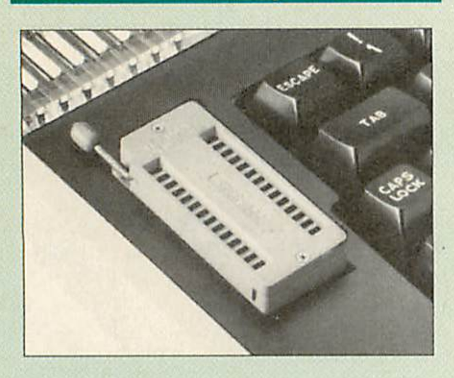
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	**£149**
AHS-3 Archi A3000 Version	**£169**

Continued→→→→→→→→→→

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18**

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

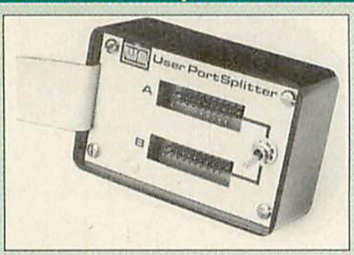
• Complete System	**£11**
• Spare Cartridges	**£2.75**
• Spare Rack	**£1.65**

ROM Cartridges for the BBC Master

Will also accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£8**; Quad **£13**

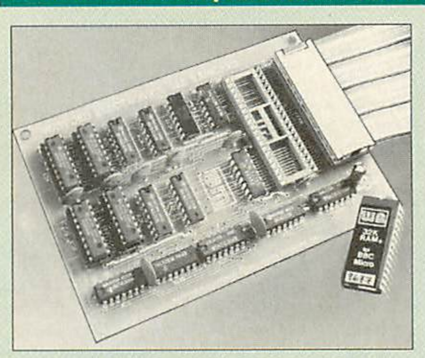
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22**

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- While word processing, you don't wait for a slow printer, type in text while printing and save on expensive printer buffers.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £54

(Price includes a comprehensive manual and the ROM)



Commander Joystick

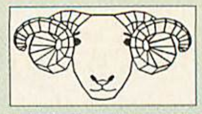


Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15



ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£59**

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	**£36**
	Aries B-12C	**£5**

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238

Voltmace Joysticks

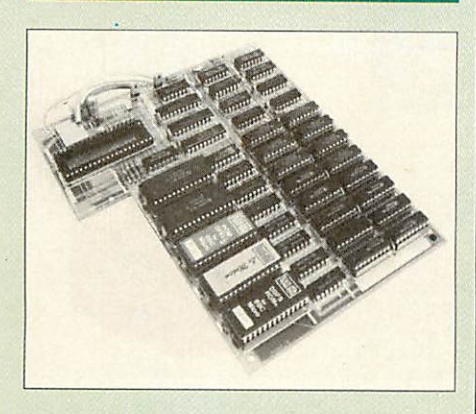
Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**
Delta-Cat A mouse eliminator Joystick for the Archimedes	**£24**

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 **£25**

ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 9 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, Watford's ROM/RAM card.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

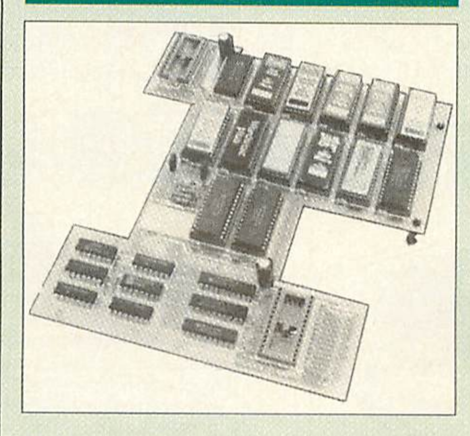
- ROM/RAM card with 32k DRAM **£45**
- ROM/RAM card with 64k DRAM **£59**
- ROM/RAM card with a massive 128k DRAM **£99**

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit **£8**
- 16k DRAM for Upgrade **£13**
- Battery backup **£3**
- Read and Write protect switches **£2 each**
- Complete ROM-RAM card with all options fitted **£109**



Solderless Sideways ROM Socket Board



The key features of this no fuss, easy to install card are:

- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer. **Only: £8**

BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs **£20.00**
- Maths with a Story 2 (Disc). 4 further maths programs. **£20.00**
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. **£17.00**
- ECOLOGY O-Level program. **£20.00**
- POLYMERS O-Level program. **£20.00**
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20.00**
- ADVANCED TELETEXT SYSTEM **£8.65**
- PERIOD TABLE SOFTWARE **£20.00**
- Computers at Work – Primary **£17.35**
- Introducing Geography 11-17 years **£17.50**
- Electric Fields 6-14 years **£11.25**
- Espana Viva – 3 Discs **£19.95**
- WHITE KNIGHT Chess game **£16.00**
- A Vous La France **£29.00**
- **FUN SCHOOL 2 – Red:** Under 6 yrs **£12.00**
- **FUN SCHOOL 2 – Green:** 6-8 yrs **£12.25**
- **FUN SCHOOL 2 – Blue:** 8 yrs+ **£12.50**
- **FUN SCHOOL 3 – Red** **£18.50**
- **FUN SCHOOL 3 – Green** **£18.50**
- **FUN SCHOOL 3 – Blue** **£18.50**
- Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ **£26**
- More French Games – Another 6 games 12 years+ **£26**
- Au Restaurant and Accident de Route 12 years+ **£26**
- Boulogne and Oh-Les – 2 programs for beginners **£26**
- Letters to French Penpals – 11 years+ **£26**
- French Programs with Henri Beret – The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 **£22**
- Six German Games – Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ **£22**
- More German Games – Aimed at pupils in their 2nd year of learning German. 12 years+ **£22**
- The Cloze Program – Using context clues to predict is much more than a gap filling exercise. All ages **£26**
- An Introduction to Electronics – Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years **£26**
- Computer Control – This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years **£26**
- The Nuclear Reactor – An interactive, menu driven program for GCSE pupils. Demonstrates & explains nuclear fission & the chain reaction. 14-16 years **£22**
- PUNCMAN Learning punctuation
  - Puncman 1 & 2 for 7 – 13 years **£15**
  - Puncman 3 & 4 for 8 – 14 years **£15**
  - Puncman 5 & 6 for 8 – 15 years **£15**
- Yes Chancellor – A chance to take over number 11 at Downing Street. 12 years+ **£18**
- Letters & Pictures – Introduces phonic skills to Infants 6-8 years **£15**
- Numbers & Pictures – Early number learning is a great fun (4-6 years) **£15**
- Note Invaders – Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) **£15**
- Maps & landscapes No. 1 (9-14 years) **£18**
- Help Your Child learn Basic Map work No. 2 (9-14 years) **£18**
- Pirate – Educational Adventure (8-14 years) **£15**
- Spelling Week by Week (6-14 years) **£18**

Archimedes Software

- Animated Alphabet (3-6 yrs) **£21**
- Arcventure (8-12 yrs) **£29**
- Bookbinder **£43**
- Bumper Disc **£14**
- Bumper Disc 2 **£14**
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- Craftshop 2 **£26**
- Christmas Allsorts – Clip Art (6-16 yrs) **£16**
- Converta-Key **£16**
- Data Word **£16**
- Desktop Stories **£35**
- DigiSim **£35**
- Dream Time (5-7 yrs) **£23**
- Droom **£19**
- Farm (5-7 yrs) **£19**
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- Fun School 2A Green (6-8 years) **£14**
- Fun School 2A Blue (8 years +) **£14**
- Gate Array Teaching System **£68**
- Glimpse Clip Art Utility (7-16 yrs) **£8**
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- Jiglet **£27**
- Jigsaw **£28**
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- Microbugs **£24**
- Money Matters **£16**
- Nature Park Adventure (7-9 yrs) **£27**
- Numerator **£60**
- Picture Book **£16**
- Recall (6-13 yrs) **£39**
- Sellardore Tales **£24**
- Snippet **£26**
- Space Mission Mada (9-13 yrs) –
- Sting of the Dump (9-13 yrs) **£22**
- Target Maths **£16**
- Viewpoints (9-12 yrs) **£33**
- Wizard's Revenge (7-10 yrs) **£17**
- Worst Witch (7-10 yrs) **£25**

Continued→ → → → → → → → → →

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Communicator	£49
Disc Doctor	£18
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42
Wordwise	£24

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
Viewsheet (Acornsoft)	£36
Viewstore	£36
Viewspell with 80 track disc	£25
Viewplot Disc	£20
(Please specify for Master 128 or Compact)	
View-Index	£12
Overview packs 1 & 2	£65
Hi-View	£38

MINI OFFICE II

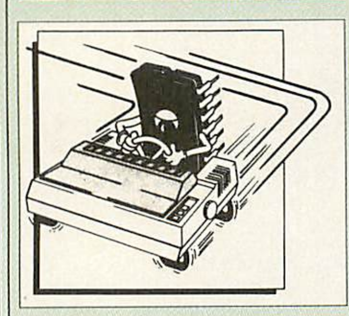
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.00
DISC Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc)

View Printer Driver Discs

Epson FX & RX 80	£10
Juki & Brother HR	£10

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £29



OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features

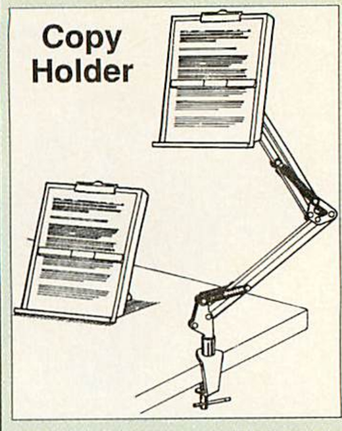
BEEBPLOT – Provides visual representation from Spreadsheet data.

Only £10 (Disc)

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £14

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£8** (carr. £3)
Angle poise **£12** (carr. £3)

The Epson RX/FX/KAGA Printer Commands Revealed Handbook

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

ALL PRICES EXCLUDE VAT

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£6.95
15 Hr Wordprocessing BBC/WW & WW+	£6.95
30 Hour BASIC (BBC Micro)	£12.95
1st Word Plus Rel. 2 Manual	£10.00
A3000 Technical Reference Manual	£29.00
Acorn DTP A Guide to	£17.00
Advanced User Guide for BBC	**£10.95**
Archimedes 1st Step – Beginners Guide	£9.95
Archimedes Assembly Language	£14.95
Archimedes BBC Basic Guide	£20
Archimedes DTP Manual	£10.00
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference Manual	£79.00
Arm Assembly Lang. Prog. Manual	£15
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Basic V – A Dabhand Guide	£9.95
BBC Basic Guide (Archimedes)	£19.95
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COMAL – Introduction to	£9.50
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ISO-PASCAL Reference Manual	£9.95
Master 512 Guide – Dabs Press	£9.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14
Master Reference Manual Part 2	£14
Master Reference Manual – Advanced	£17
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Example Programs on Disc for above	£4.95
PASCAL Programming	£10.95
Risc OS Style Guide	£9.95
RISC Technical Manual 260 pg	£14.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
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View Guide (View 2.1)	£5.00
View, Viewsheet & Viewstore – Mastering	£12.95
Viewsheet & Viewstore Dabhand Guide	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
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1-2-3 Using – Rel. 3	£25.95
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8086/8088 Programming the	£17.95
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Carriage on Books vary between £2 to £3.50, depending on their weight

New Release

ACORN TO PC

Stop the Confusion!

Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quicly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way – from Acorn to MS-DOS, or from MS-DOS to Acorn.

'ACORN TO PC' also acts as a handy reference guide to all Acorn star commands and their MS-DOS equivalents. It also has an extensive and readable explanation of the directory tree and hierarchical filing systems in general. Both DFS and ADFS Acorn systems are covered.

'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £12.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.

Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc, and Networking. Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work – even giving advice on writing and marketing your own programs.

A book you will enjoy to use as a reference, or read from cover to cover, over and over.

Only: **£14.95** (No VAT)

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed.

Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's.

Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

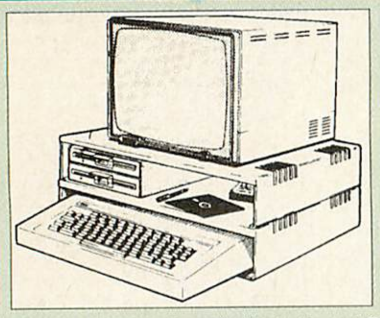
Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual. (Will only work on 360K Disk Drives & read only ADFS and Watford DDFS – not DFS).

Price: £39

(Please write in for technical literature)

Continued→ → → → → →

Plinths for the BBC B & Master 128K Micros

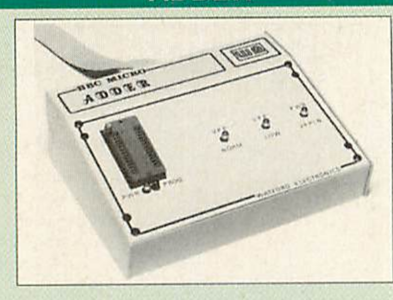


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

ADDER



The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: 2516, 2716, 2532, 2732, 2764, 27128, & 27256.

£65 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

- **ERASER EB** – Standard version erases up to 16 chips. **£34**
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£36**
- Spare UV tubes. **£12**

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

VISA

Servisol Foam Cleaner

This king size multipurpose foam cleaner spray is ideal for cleaning Keyboard, Monitor, Disc Drive & Computer furniture surfaces. **£2.50**

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens. **£2.50**

Aerosol Dust Spray

Ideal for removing dust & dirt from Keyboard & similar inaccessible spaces. **£3**

Spares for BBC Micro

UHF Modulator	**£4**	16MHz Crystal	**£2**
Speaker Grill	**£1**	17.734 MHz Xtal	**£2**
Speaker	**£3**	32.768MHz Xtal	**£1**
Keyswitch	**£1.50**	BBC B Refurbish	
Master PSU	**£59**	Casing	**£25**
Master Keyboard	**£62**	Keyboard	**£46**
Master Casing	**£49**	Power Supply	**£59**

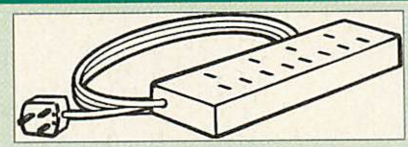
Replacement Flexible 17 way Keyboard Connector **£4**

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightening or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. **£9.50**

Aries Spike Cleaner Unit

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System **£14.95**

ROM Extraction Tool

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**

Metal Chip Extractor **£3**

28pin DIL Header Plug

SOLDER type **£1.50** IDC CRIMP type **£1.95**

8 Way DIP Switch

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

28 pin ZIF SOCKET (Textool) **£6.95**

Connecting Leads

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 3 pin DIN Plug + 1 Jack Plug	**£2.50**
to 7 pin DIN Plug	**£3.00**
to 3 Jack Plugs	**£2.50**
6 pin DIN to 6 pin DIN Plug (RGB)	**£3.00**

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	**50p**	**75p**
RS423 (5 pin Domino)	**70p**	**80p**
Cassette (7 pin DIN)	**40p**	**95p**
ECONET (5 pin DIN)	**35p**	**50p**
Paddles (15 pin 'D')	**150p**	**250p**
Disc Drive Plug 4 way	**100p**	–
6 way Power Connector	**120p**	**150p**

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below). **£14**

Watford POWER DUCK **£8**

CHIP SHOP

1 MB-10 DIL D-RAM	**£4.50**
1 MB ZIP D-RAM	**£4.90**
256K x 4-8 DIP	**£4.75**
256K x 4-8 ZIP	**£4.80**
DS3691	**£4.50**
DS88LS120	**£5.25**
LM324	**£0.45**
SN76489	**£5.50**
SAA5050	**£8.75**
UPD7002	**£6.00**
2764-250nS	**£3.00**
27128A-250nS (12V5)	**£2.50**
27128-250nS (21V)	**£4.00**
27256-2	**£3.00**
27512-2	**£4.50**
27C101G (1 Meg)	**£7.00**
4013	**75p**
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4164-10	**£1.55**
4464-10	**£3.50**
4816 RAM	**£2.00**
41256-8	**£2.00**
41256-10	**£1.50**
6264LP-8K	**£4.00**
6502A CPU	**£5.00**
65C02 3M	**£9.75**
65C12	**£9.00**
6512A	**£10.00**
6522	**£4.00**
6522A	**£5.00**
62256ALS-15	**£10.00**
62256P-12	**£8.50**
6818	**£4.00**
6845SP	**£6.00**
68B50	**£2.95**
68B54	**£7.50**
7438	**50p**
74LS00	**50p**
74LS04	**50p**
74LS10	**50p**
74LS123	**£1.00**
74LS163	**£1.00**
74LS244	**£1.00**
74LS245	**£1.00**
74ALS245	**£2.75**
74LS373	**£1.00**
74LS393	**£1.00**
75453	**£1.00**
75159	**£3.00**
9637	**£2.00**
ICL7673PA	**£3.00**

Assorted ROMS

ACORN ADFS	**£25**
ACORN BASIC 2 plus User Guide	**£22**
Acorn BCPL	**£42**
ACORN DNFS	**£17**
Acorn FORTH	**£32**
Acorn Graphics	**£25**
Acornsoft C Disc	**£36**
Acorn LISP	**£19**
Acorn OS B+	**£25**
Acorn OS 1.2	**£14**
Basic Editor	**£24**
BBC PCB Designer	**£49**
Beebmon	**£22**
Buffer & Backup	**£20**
Communicator	**£49**
Dump Out 3	**£25**
EPSON NLQ ROM	**£25**
Graphics Extension Rom	
GXR-B	**£21**
GXR-B+	**£22**
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MASTER OS ROM	**£38**
Master ULA (47)	**£15**
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Micro Prolog	**£25**
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Numerator – Archi	**£69**
Numerator – BBC	**£39**
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Rom Manager	**£20**
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SERIAL ULA	**£13**
TED	**£35**
Termulator B, B+	**£28**
Termulator Master	**£32**
Video ULA	**£14**
ULTRACALC II	**£26**
1Mb OS ROM	**£39**



Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's NEW innovative IDE interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes user. Because of the integration of the controller and drive electronics onto one compact board, Watford Electronics have been able to include extra features into the drive, such as Caching, where tracks are buffered in fast memory, reducing access times and increasing throughput. All these benefits make IDE drives far more attractive than conventional ST506 drives or SCSI.
Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.
Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.
A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.
By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

*Commands

*IDELock
*IDEUnlock
! DEFS
Selects the IDE filing system 'IDEFS'.
*IDEDrives
Displays the configuration and native characteristics of installed drives.
*Configure IDEFSDirCache
*Configure IDEFSBuffers
*Configure IDEFSDrive

Typical transfer speeds

Prairie Tek 20Mb		650K bytes per second
Seagate	43Mb	800K bytes per second

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£249
ADA 0530	100Mb	16mS	£395
ADA 0570	200Mb	15mS	£535
ADA 0580	330Mb	15mS	£POA

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000 **£85**

Internal Hard Disc Drives for A3000

ADA 0700	21Mb	23mS	★£275
ADA 0720	44Mb	28mS	£TBA
ADA 0730	89Mb	18mS	£TBA

Available Soon

Supplied complete with Podule, Fan, Cable & Fitting instructions.

★ Tentative Launch Price

Archi IDE Hard Cards

"Simply plug and play"



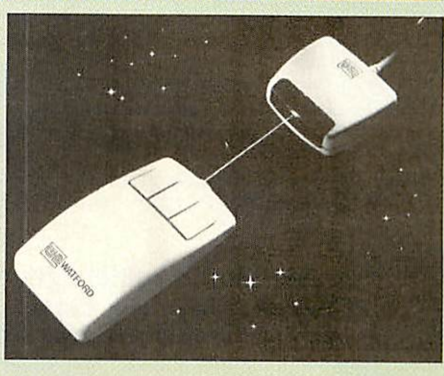
Watford's NEW low cost, high performance revolutionary IDE Hard Cards for the A300 and A400 series Archimedes are unbelievably easy to install – you simply slot one into any vacant podule backplane slot in the rear of your computer. These stunningly engineered, light weight but fast, 2.5" miniature hard drives are mounted onto the professionally designed cards, and are supplied with the fully Acorn-conformant IDE Filing System ready installed and ready to run. A novel feature of the hard cards is that they can be easily removed and transported to another Archimedes, for example to make a hard disc backup, or to transfer saved files from work to home etc. Security of files on the hard disc is ensured by our unique security password lock, which allows files to be read only, but not overwritten or deleted – ideal for use in school applications where the integrity of your master software needs to be retained.

ADA 0650	21Mb	23mS	£345
ADA 0660	44Mb	28mS	£495
ADA 0670	89Mb	18mS	£TBA

(Can be used as a Removable Hard Drive)

NEW

Archimedes Cordless Mouse



Ever found that using a mouse on a busy desktop has its problems? The cable is always being caught up in papers, tangled round equipment and other cables etc, and what about that cup of coffee spilled over your work!

Watford Electronics' new Cordless Mouse solves these problems by removing the cause for concern - replacing the cable with a simple infra red link. It still provides all the speed and easy control of a conventional mouse, but with complete freedom. In use, there are no operating differences between the standard mouse and the new cordless mouse so all mouse functions and mouse driven RISC software will be fully compatible. Pinpoint accuracy is ensured by a unique Accelerator button, which, when pressed, moves the pointer by just a tiny amount for a large slow movement of the mouse, but by a large amount for a quick wizz of the mouse.

Features

- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £59

Watford Electronics are:

- Acorn Qualified Dealer & Econet Referral Centre
- ARIES PC Dealer/Distributor
- Canon Authorised Printer Dealer
- Cambridge Computer Dealer
- Computer Concept Premier Dealer
- EIZO Monitor Dealer
- Microvitec Appointed Dealer
- NEC Appointed Dealer
- Panasonic Premier Dealer
- Roland Plotter Official Dealer
- Star Printer Premier Dealer
- Taxan Appointed Monitor Dealer
- 3M Media Premier Distributor



Watford Electronics

250 Lower High Street, Watford WD1 2AN, England
Tel: 0923 37774/240588 Fax: (0923) 33642 Telex: 8956095



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★INFO

DAVE ACTON and **DAVE LAWRENCE** deliver their monthly mix of bits and pieces for your eight and 32-bit machines

COMPATIBILITY KEY	
B	BBC B compatible
B+	BBC B+ compatible
M	Master compatible
C	Master Compact compatible
E	Electron compatible
A	Archimedes compatible
A3000	BBC A3000/A5000 compatible

CHINESE CHECKERS

One recurring theme in ★INFO is that of the board game. In the past, we have published BBC and Archimedes versions of *Atoms*, complete with computer-thinking routines. This month we would like to present a composition of our own. *Checkers* is an Archimedes, player-only version of that well-known board game – chinese checkers.

This is a game for one to six players and is played on a star-shaped board made up of regular hexagons. The points of the star are home bases, one for each player, and these are coloured accordingly. Each player has 10 pieces of equal value. At the start of a game these pieces are placed in the point opposite the player's home base.

If two people are playing, it is usual to play opposite each other. Only the outermost 10 hexagons are used, the five coloured hexagons closest to the neutral white area in the middle are not used. Players take it turns to move one of their pieces.

A move can either be to any adjacent hexagon or it can be a series of jumps. You can jump over any piece in an adjacent hexagon, which has an empty hexagon behind it.

If a player jumps over more than one piece, the jumps do not need to be in the same direction each time. The only restriction is that pieces must end up on a hexagon of their own colour, their opposite colour (the colour they started on) or white. The diagram on the next page shows all the possible moves in a certain game position. The winner is the first player to get every piece into the outermost 10 hexagons of their home base. There is no second place and the game cannot end in a draw or a stalemate.

Before you can play, you will need to run the *MakeHexes* program. This creates a sprite file containing hexagons, pieces of various colours and a couple of mouse pointer definitions. You may like to load the output file, *Hexes* into *Paint* to see exactly what is created.

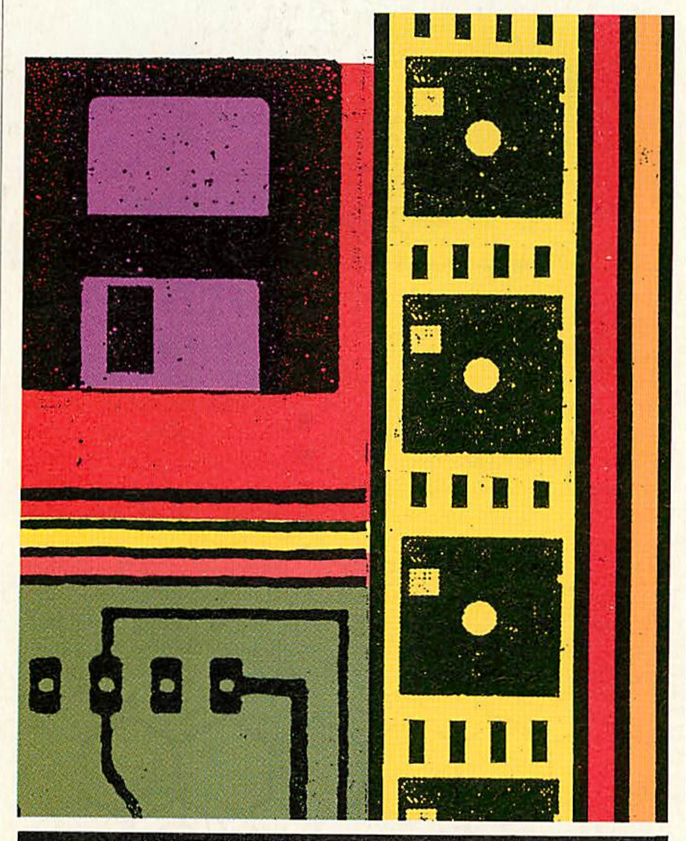
When *Checkers* is run, you will be asked to indicate which colours are playing. Players can be toggled on and off by clicking on their home bases using the Select button. Any number of players are allowed to play in any configuration. Pressing the Menu button will start the game.

There is no text in the game, so the colour of the mouse pointer is used to indicate which player is the next one to move. When you click on a piece, the mouse pointer will change from an arrow to a representation of the piece and the hexagon itself will change to the player's colour. To move, click on the destination hexagon with the Select button.

Invalid moves will not be allowed. For instance, if the piece is placed back on its starting square, no move is made and you can select another piece.

A cheat mode has also been built into the game. To use it, select a checkers piece and press the Menu button. This will highlight all the hexagons that can be reached by that piece in one move. No penalty is made for using this facility, despite the fact that it makes the game far easier to play.

When the computer detects a winner, the border slowly pulsates in the colour of the victor. Pressing any mouse



★INFO COMPATIBILITY TABLE

LISTING	NAME	BBC B	MASTER	ELECTRON	ARC
Info 1	MakeHexes				★
Info 2	Checkers				★
Info 3	String				★
Info 4	CombDemo	★	★	★	★
Info 5	HexOne8	★	★	★	
Info 6	HexTwo8	★	★	★	
Info 7	LocalErr1	★	★	★	★
Info 8	LocalErr2				★
Info 9	Spin				★
Info 10	CSwitch	★	★	★	★
Info 11	Spoodle8	★	★	★	★
Info 12	Spoodle32				★
Info 13	Recur1	★	★	★	★



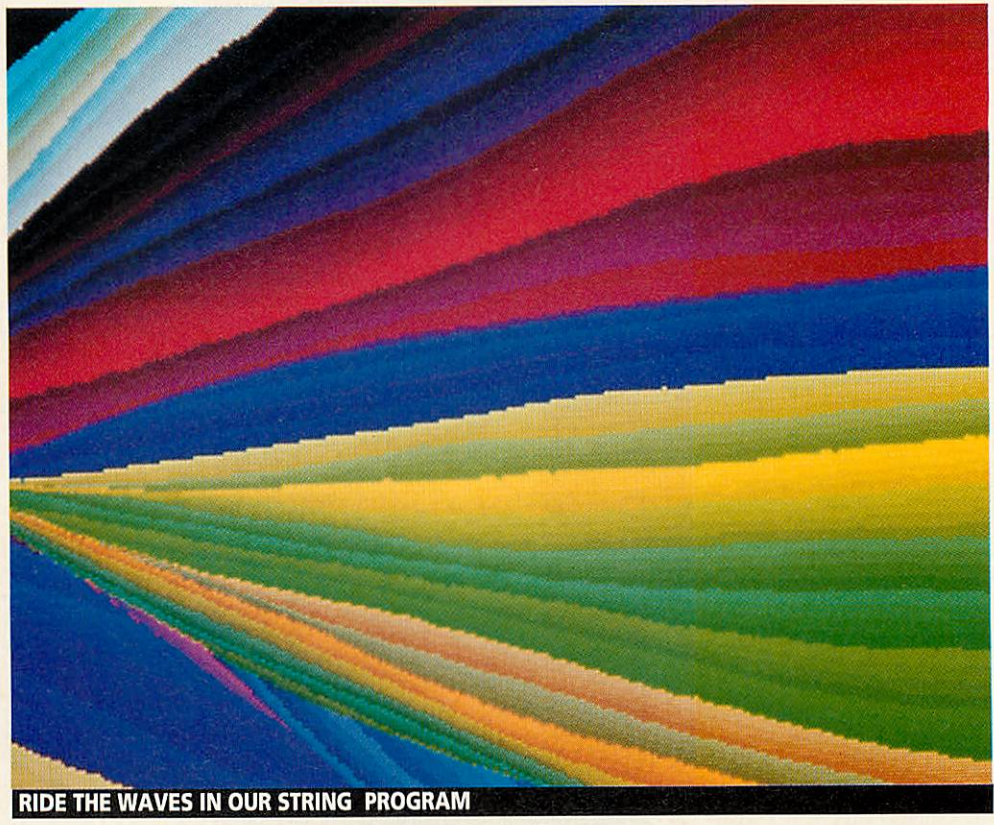
button at this point will return you to the player-entry routine in readiness for another game. And that, as Bruce Forsyth would say, is all there is to it.

The more adventurous amongst you may like to examine the PROCconvsquare routine which takes the screen co-ordinate returned by the mouse and converts it into a hexagonal board position. This particular piece of code is rather tricky and took over an hour to get right.

In the game routine itself, the method of detecting a winner is rather neat – take a look at the inplace(player)+=... line to see how it works. Another area worth looking at is the PROCjumps routine. This part of the program provides a example of recursion and is used to work out which hexagons can be reached by jumping.

The entire board is stored in data statements at the end of the program. Theoretically this could be altered to generate different playing areas, although this theory has not yet been put to the test.

Now of course, all we want you to do is sit down one rainy weekend and write us a desktop version, a BBC version and, of course, a computer-play option. Monetary rewards await the best one received.


RIDE THE WAVES IN OUR STRING PROGRAM

★PRIZE £20★

AND ANOTHER STRING

B B M C E A **Jan Vlietinck** achieved fame in last month's issue by brightening your screens with his fireworks program. Now he has provided another visual delight in the shape of a program called *String*. It is difficult to describe what *String* actually does – it is rather reminiscent of a multi-coloured wave machine on your computer screen.

A simple line is plotted in cycling colours across the screen. The position of the left end of the 'string' is determined by the horizontal position of the mouse. Move the mouse from side to side to set up a 'wave'.

The height of the wave at any point is determined by applying a fairly simple formula to the height of the nearby points. A table, xtab, is used to store the point position. Each time the wave is plotted, the first entry in the table is set according to the mouse position. The effects of moving the mouse will filter through the entire line, frame by frame.

If you prefer, it is easy to change the program so that vertical mouse movements control the wave. Simply alter line 250 to MVN a,r1,LSL #20.

★PRIZE £15★

SORTING IT OUT

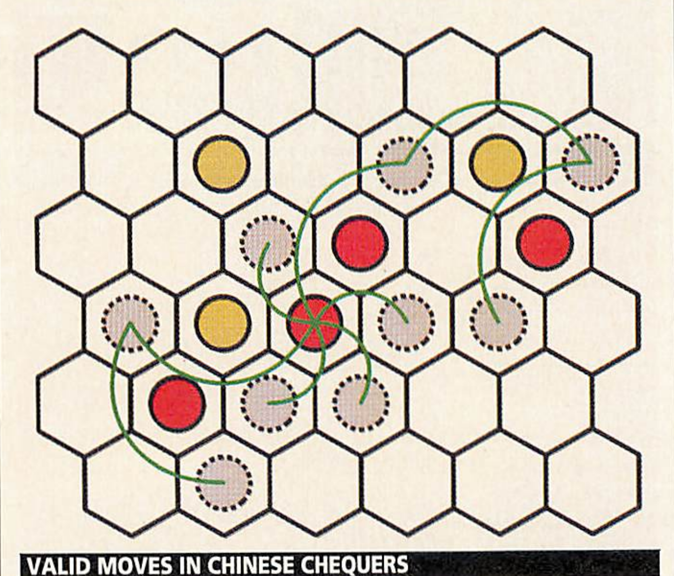
B B M C E A In the very first ★INFO column, *BAU* July 91, we had a feature on sorting algorithms. Six methods were introduced and illustrated graphically by means of a simple Basic program. Now a short follow-up to this has been sent in by **Colin Attenborough** showing how the simple bubblesort can be radically improved. Unfortunately for Colin, this is not an original idea as it first appeared in the April 91 issue of *Byte*, in an article by Box and Lacey. However he still earns himself £15 for sending the principle in to us.

The bubblesort is the simplest of all the sorting algorithms, both to understand and to code. Go through the list of data, element by element, applying the following criteria: if the x+1th element is 'larger' than the xth element, then swap the two elements in the list. Repeat this until all of the elements in the list are sorted. This point is reached when a pass of the data is made where nothing is swapped.

Unfortunately, the bubblesort is painfully slow but, with a few simple changes, some dramatic speed improvements can be made.

Rather than comparing elements x and x+1, the new method compares elements x and x+g where g is the gap. The gap is initially set to n, the number of elements. Before each pass of the array, g is set to INT(g/1.3).

The value 1.3 has been determined experimentally to


VALID MOVES IN CHINESE CHEQUERS

be the optimum value in terms of speed. Once g reaches one it stays at one. A further refinement sets g to 11 if it is calculated as nine or 10, and this merely hastens its descent to one. The inventors call this algorithm 'combsort'.

CombDemo shows how this technique can be implemented in Basic. It has been written so that it can be slotted into the original *SortDemo* program from the July issue. *CombDemo* is renumbered from line 10 but if you wish to include it in *SortDemo*, simply ignore these line numbers and tack it on to the end of *SortDemo*. You will also need to add comb to the end of line 450 and change the 6 in line 430 to 7. A full version of the original *SortDemo* can be found on the monthly disc.

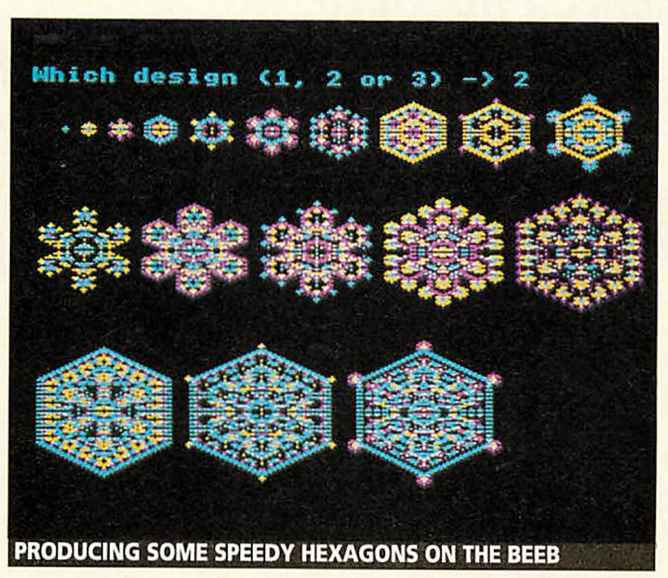
Compared with other sorting algorithms, combsort comes out very favourably. If you run *SortDemo* with 256 data items, *CombSort* sorts the data in a similar time to an exchange sort, but uses a fifth of the moves and an eighth of the comparisons. It is also roughly 18 times faster than bubblesort. Quite impressive statistics, for the price of a few extra lines of code.

★PRIZE £20★

SPEEDY HEXES

Paul Corke of Harleston is a bit of a sucker for programming challenges (his words, not ours). He saw the Basic versions of *Hexlife* in the October Pieces of Eight column and decided to convert them into machine code. His efforts, called *HexOne8* and *HexTwo8*, can be found on the yellow pages and work significantly faster than the old version. In fact, Paul told us that *HexTwo8* runs too quickly for the first few generations, so you may want to slow things down by adding a JSR OSRDCH at the end of the main loop.

Both programs are direct translations of the listings given in the October issue – so much so that they still use VDU sequences to plot the points and an OSWORD call to read points from the screen.



PRODUCING SOME SPEEDY HEXAGONS ON THE BEEB

HexOne8 runs roughly 10 times faster than the original Basic program. It must be possible to make it even faster with some hand-tweaked, vote-casting code.

And while you're at it, don't forget we would still like to see an Arm version as well.

FATAL ERRORS

Handling errors has always been tricky and some new features, added to Basic when the Arc arrived, were designed to ease matters. Before looking at Basic 5 though, let's remind ourselves of the error handling capability of the Beeb – namely the ON ERROR command. This could be used to trap all but non-fatal errors (like No room or Bad program) and, with care, it could handle a variety of errors intelligently.

But this method was not without problems. For one thing, only one ON ERROR could be active at any one time. So, for example, you might be writing a text editing program and wish to trap errors like Escape. Upon selecting a save option, you might want to watch out for a different set of errors like Bad filename or Directory full. Having finished with the save option, you would wish to return to the main loop and look out for the original set of errors. Handling everything correctly would require careful redeclaration of the ON ERROR command.

Another problem with errors on the Beeb is that the procedure stack is literally thrown away as soon as an error occurs. So, although you can have an ON ERROR command in a procedure, you will not be able to return from that procedure afterwards by using the normal ENDPROC. Instead you have to jump to the main loop.

LocalErr1 illustrates the problems of error handling on eight-bit machines. It is a simple text editor with a main loop that gets keypresses and then prints out the characters on the screen. There is a simplified save option, which is selected with CTRL-S. As with many programs, there are two levels of error handling.

Firstly,6 errors may be generated in the main loop. The easiest way to do this is to press ESCAPE. The ON ERROR command at line 130 traps this error, reports it using PROCglobalerr and jumps back to line 120. This ensures the REPEAT...UNTIL loops are correctly set up again.

When CTRL-S is pressed, PROCsave is entered and you are asked for a filename. At this point, you can generate different errors. Just pressing RETURN will cause a filing system error, since the filename will be invalid. This error is picked up by the ON ERROR at line 320 which reports the error using PROClocalerr and then jumps back to line 120 again. You can not follow the ON ERROR with an ENDPROC, since the procedure stack has already been discarded. Instead we must jump back to line 120 to sort out the REPEAT...UNTIL loops and redeclare the ON ERROR at line 130. If the save is successful, we also need to restate the original ON ERROR command.

This is done legally: because key% is equal to 19, the UNTIL condition on line 230 is satisfied and the program makes it back to line 130 again.

So-called local error handling – where you can trap errors safely within a procedure, without having to worry about the effect on the rest of your program – was not possible in Basic until the Arc came along. Now the story is different. Although care is required, it is generally much easier to handle errors effectively on the Arc and *LocalErr2* illustrates what can be done.

There are three ON ERROR statements in *LocalErr2*. The first, at line 80, traps global errors that occur in the program. There is a deliberate mistake at line 100 and this will be picked up by the ON ERROR at line 80. The second ON ERROR is local to the procedure PROCfred (at line 150) and will pick up the mistake at line 180. Finally, the ON ERROR at line 240 is local to PROCjim and will detect the error at line 260. If this sounds too confusing for words then take a closer at the program in yellow pages.

A point to remember is that if local error handling is used in a procedure, you must include the line LOCAL ERROR at the start. This means that Basic will remember the level in the procedure tree where the error occurred, so the structure of the program can remain intact afterwards.

The ON ERROR itself must be followed with LOCAL so that Basic can understand exactly what you want. Finally, before the ENDPROC there must be the command RESTORE ERROR. (This should be included for each ENDPROC when there are more than one in a procedure.) You will notice that even the ON ERROR LOCAL commands, at lines 150 and 240, issue RESTORE ERROR commands before returning. This is vital

in order to avoid any confusion in Basic.

Running the program will produce the expected results. The error in PROCjim is picked up first, then the error in PROCfred and finally, the global error at line 100.

★PRIZE £15★

GOING FOR A SPIN

Regular contributor **Barry Wickett's** latest graphical offering enables you to take your sprites for a spin. It is a sprite-rotation routine, written in machine code. Not only is it fast, but it also takes notice of the current graphics window and clips the rotating image accordingly.

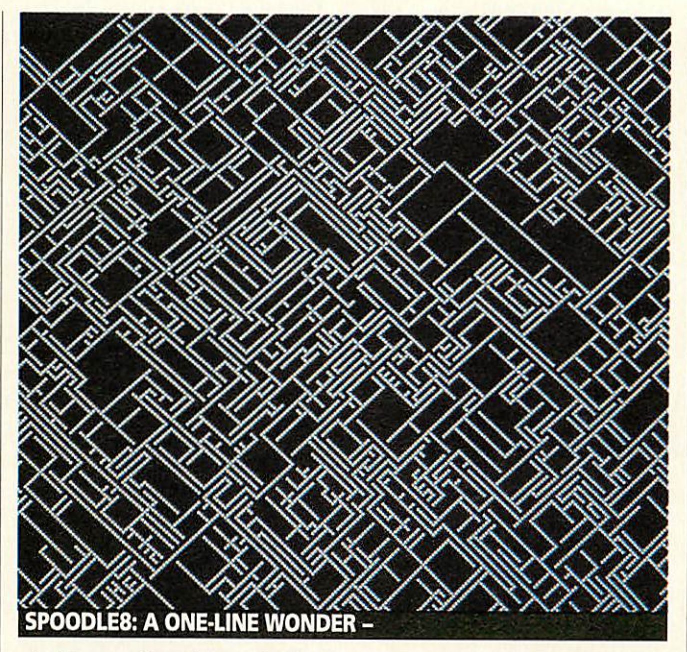
Spin is surprisingly short, consisting of a small piece of assembly language, which is the rotation routine itself and some Basic to provide a little demonstration of the technique. As is often the case, the good, old *PaintDemo* file that comes on your application disc is used to prove the point.

In fact, *Spin* expects to find it in the same directory, so alter filename$ in PROCinit if you have it saved elsewhere. Of course, the routine can rotate any mode 13 sprite, so feel free to try one of your own.

PROCplot displays a sprite at a given position, angle and scale. The COS and SIN values are calculated for the angle and, to avoid messy programming, are multiplied up and passed to the code.

The method used by *Spin* is the 'safe' one in which each point of the original sprite is plotted at the appropriate scale and angle. The advantage of this is that the code is quite short, but care must be taken to ensure that the sprite is not too large or 'holes' will appear, to which no points of the original image are mapped.

Then OS_ReadVduVariables is called to find out the current graphics window so that the rotate image can be clipped accordingly. Because the mode used is 256 colour, the clipping is quite straightforward since each pixel takes up a whole byte of screen memory. If you wanted to write a similar routine for mode 12, care must be taken to avoid splitting a byte in two with the current window. One way, although this is probably not the quickest, would be to grab a series of rotated sprites and use OS_SpriteOp to do all of the hard work.



SPOODLE8: A ONE-LINE WONDER –

★PRIZE £20★

JUGGLING ACT

Beeb users may feel a little left out these days with all of the talk about multi-tasking environments. So to prove that even the humble eight-bit micro is capable of doing more than one thing at a time, **Jon Williams** has supplied a little demonstration. Called *CSwitch*, it allows two simple programs to run concurrently on a single machine.

Context switching, as the process is often called, is managed by a small piece of interrupt software which preserves the context of program A, runs program B for a while and then switches the context back to A again.

For simplicity, the two programs (labelled .ay and .bee) perform very basic tasks. As you might guess from their respective names, they simply move a letter (A or B) down a mode 7 screen.

However, by looking at the listing you can see that the programs are entirely separate.

The process of task-switching is set up by calling fork. This keeps the address of the other routine you want to run in the X and Y registers. Having called fork you should then run your first task. The second will run concurrently and switching will take place invisibly. How often the tasks are swapped is determined by the value passed to fork in the program .ay.

A very small value will result in much, or indeed all, of the 6502's time being spent swapping contexts. Too large a value will lead to visible interleaving and you will be able to see the context being switched. Reasonable values to choose are those between 32 to 255.

The 6502 provides a timer that the user can employ in programs. This timer has a handy free run mode which means you can set it to a particular value, from which it will repeatedly count down to zero. Every time zero is reached, an interrupt (IRQ) generated and the context swapping routine is called. The timer is immediately reset to the original value so the IRQ routine will be called at regular, definable intervals. The timer can be found in the area of memory called SHEILA. The table below lists some important timer addresses that occur in the program.

SHEILA'S ADDRESS

&FE6B	auxiliary control register set top two bits to 01 to set timer in free-run mode
&FE6E	interrupt enable register set top two bits to enable timer 1 interrupts only
&FE64	timer 1 – low byte
&FE65	timer 1 – high byte
&FE66	timer 1 latch – low byte
&FE67	timer 1 latch – high byte

Obviously the type of program that can be run using this method is limited. It is unsafe to use those that have too many operating system calls, since they could conceivably be called by both programs at the same time.

Currently the context swapping code only ensures that the 6502 stack is preserved for each task, so any calls that require workspace (OSWRCH for example) may run into problems.

Other calls may work though, and if you are careful and preserve further bytes of workspace you may be able to write much more sophisticated multi-tasking examples.

As it is, you can see the principles in action by adding an RTS immediately after line 190. The second task will run in the background while Basic becomes the primary task. Why not try listing the program while B whizzes around the screen.

THE SPOODLE DOODLE

An example of one-line recursion can be found in the shape of *Spoodle8*. The output is really a recursive tree in disguise. A line is drawn in small segments and this changes direction at random. When it encounters another line it stops. However, at random times along its path the line divides and new growths head off in other directions. These too subdivide and a curious diagonal maze gradually fills the screen. The program is recursive in nature, although not in structure.

Although *Spoodle8* fits on one line, you may have trouble typing it in, unless you have an Archimedes (in which case use



the Basic Editor). However, **Garry Quested**'s cunning one-line utility (which can be found on this month's puzzle page) will enable you to enter the doodle on a single line.

Spoodle32 is an Archimedes version of *Spoodle8* that makes use of colour cycling. Oddly enough, it does not fit on one line, so it has been written using procedures to illustrate the recursive techniques employed.

Spoodle32's line can travel in eight directions. PROCspoodle is called with several parameters – the current position of the line, a colour code and a direction. When a line splits PROCspoodle calls itself and the position and colour code are passed on to the next level. A new direction is chosen at random. The colours used in the line will cycle from one up to 15 and then back to one. Because the current colour is passed on at a junction, each branch will follow the same colour sequence. This is important when the palette-switching part of the program is run. After the screen has been filled with the pattern, the colours used are changed in a pulsating fashion. Light pulses move along each track and divide at junctions.

You can alter the overall effect in various ways. Here are some suggestions for you to try for yourself.

- Experiment with slower colour changes by reducing the value added to c in line 390. A value of 0.1 will result in larger pulsating areas and an entirely different effect
- Simplify the tree by reducing the amount that sub-branches turn away from their parents. To do this, you can change the RND(3) at line 300 and 340 to RND(2)
- Alter the shape of the tree by changing the AND 7 at lines 320 and 330 to AND 3. You will also need to remove the ORIGIN command at line 80 for the screen to be filled. The result is a tree that grows from the bottom left of the screen to the top right corner and waves of light will move across it during animation. Changing the AND values to six and five will also produce some different patterns
- Try changing the likelihood of direction changes and splitting lines by experimenting with the RND values at lines 300 and 340
- Increase the scale of the line segments by doubling the DATA values at the end (to 16 and -16).

RECURRING NIGHTMARE

Recurl is a program I have been meaning to write for a long time. Its output is nothing new or particularly special – just the persian rug style pattern obtained by plotting a square and then plotting half-size squares centred on each corner of the original square, then quarter squares on each of their corners and so on. This pattern is usually drawn by a simple recursive procedure that is called with x and y coordinates, square size and a recursion level.

On each call the level is increased by one. If the procedure is called with too large a number, then it returns without plotting anything. *Recurl* is a little special in that it plots the pattern recursively, but can be entered entirely on one line of Basic!

The idea of a one line recursive program has been lying around on my dry-wipe board for many years now but, until I actually wrote it, I didn't know if it was possible. The final program is one line with one GOTO and four GOSUBs.

There a few devious contortions that must be used to achieve this. The first and most useful is this: if you add a constant to a variable, the variable is effectively assumed to be zero before the addition is made. It is therefore possible to say a=a+1 with no error being generated; a is set to one. This allows us to say L=L+4 at the start of our line. L represents the recursion level, hence the immediate check if it reaches the value 36.

More importantly it allows us to perform some initialisation. After checking IF L=4,

the program selects mode 1, sets up the initial square position and size and DIMs some stack space. Normally all stacking would be performed by Basic's procedure call, but we can't use them here, hence the X and Y memory arrays.

As we are dealing with numbers over 255, we have to reserve enough memory for 10, four-byte words which can be accessed with the ! indirection operator. Using indirection rather than arrays saves a character each time the 'array' is accessed, making the line shorter. After this, the program GOTOs itself to do the plotting. Don't forget that L will now be eight, so the program will skip past the initialisation.

The main body of the program starts by halving the square size, which is initially set to be twice as big. It also preserves the current x and y coordinates on their respective stacks. A colour is selected according to the level of recursion and the square is plotted with a VDU sequence that defines and then clears a graphics window. Four recursive GOSUBs are then used to produce the pattern. Before each one, x and y are set to appropriate corner of the original square. Next, the recursion level is reduced by four and the square size doubled. This ensures that the values of L and s remain intact for the call above us in the recursive tree. Of course, all recursion may have finished, Leaving the program back at the surface again. In this case L will be four and we must not RETURN or we will get an error. Instead we do nothing and the program will then terminate successfully.

RECUR1: A CLASSIC CASE OF RECURSION

★QUIT

Next month you will be able to sample our usual motley collection of programming titbits, including a fly simulator – of the six-legged variety!

But, you would probably find it even more thrilling if your own program was included. As you can see from this month's selection, it does not always matter if the idea is not of your own devising. We'll print any good programs that come our way.

Send your submissions to us at ★INFO, *BBC Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. All but the shortest programs should be submitted on disc with a brief description of their purpose and operation. A stamped addressed envelope with your submission will ensure the return of your disc.

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GPB	WR/	106K	BASIC
GradTint1	WR/	24K	DrawFile
HEALEY	WR/	121K	Sprite
HomeAccnt	WR/	9K	Sheet
Inventions	WR/	165K	Jnr Data
LESLEY	WR/	121K	Sprite
screen	WR/	154K	Sprite
Spitfire	WR/	35K	DrawFile
Style	WR/	142K	BASIC
Title	WR/	60K	DrawFile
Tutor	WR/	28K	Sheet
View2	WR/	160K	Sprite

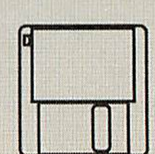
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THE CHART SHOW

Figures can be used to brighten up a dull report. **MIKE CURNOW** shows you how to create graphs for your DTP pages

To improve your DTP documents, it is a good idea to include diagrams wherever possible. They break up the text and often make a piece easier to understand. Armed with *Edit*, *Draw* and a DTP package, you can produce professional-looking reports and documents on the Archimedes. But what about the lists of numbers and figures? The traditional way to show such data is in a graph.

Bearing this in mind, the *Graph* application in this month's yellow pages produces graphs that can be used in DTP documents. Its main purpose is to draw the graph accurately, provide a suitable scale, preview its appearance at a certain size and produce an output file in *Draw* format – all the graphs can then be manipulated and printed from the *Draw* application.

BUILDING A GRAPH

Creating a graph is a three or four-stage process. Firstly you need to put the data into a suitable format. The easiest way to create a description file is to use *Edit* but is also possible to use a Basic program, as explained later. A typical *Graph* description file, seen in the screenshot opposite, is a list of keywords and numerical data, used to control the graph.

A full list of keywords is shown in the table and they must always precede numeric data in the description file. Note that a keyword can be upper or lower case and that, although text is accepted in double quotes, this is not compulsory. The x and y values must be entered in ascending sequence and the resulting description file is then saved as a text file.

To start *Graph* double-click on its icon in the directory viewer. As *Graph* uses the outline fonts you must also double-click on the Fonts directory before you can run it. To load your description file, simply drag it from the directory viewer on to the *Graph* icon. You can now use the various menu options to choose the type of graph, the fonts and the graph size. When you are happy with the results, save it to disc with the Save menu option.

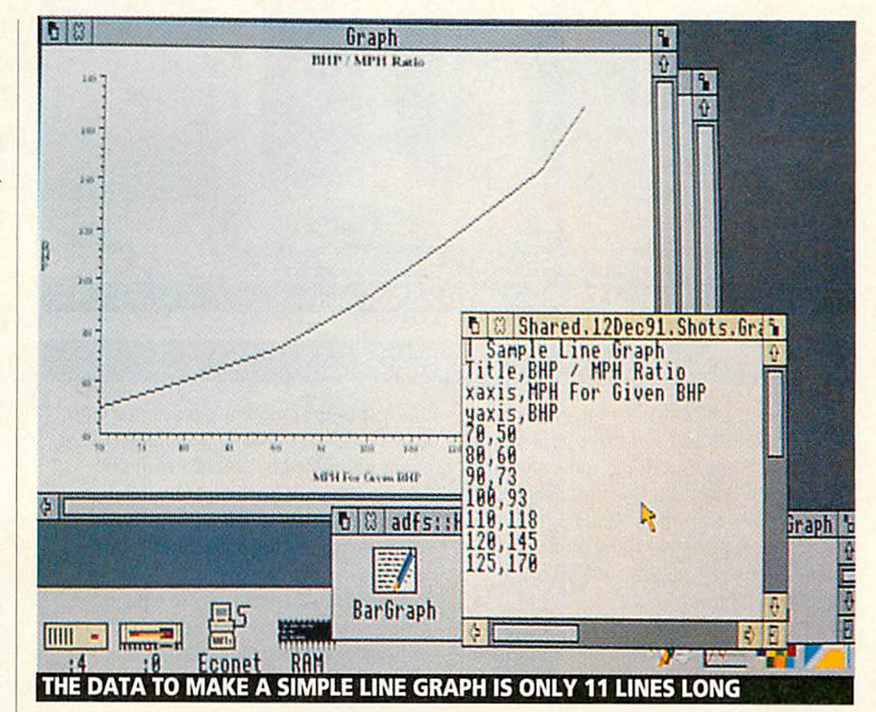
The resulting file will be in *Draw* format, so it can be processed by many packages. You can take the file and load it directly into your DTP package or, alternatively, you can load it into *Draw* itself for final editing. For example, you may want to add more labels, change the position of the titles or alter the colours. The screenshot above shows the bar graph produced from our sample data list.

When plotting a set of x and y values it is traditional to use a line graph, the default format chosen by *Graph*. A line graph simply draws a line between the pairs of x and y values. But when there is a lot of data to plot, line graphs can look messy because of the large number of points. To overcome this, we can plot the average y value for a given range of x values. Although it is possible to plot these averages via a line graph, it is better to use a bar graph, where the width of each bar shows the range of x values that were averaged.

To plot a bar graph, rather than a line graph click on Bar Graph in the options panel. A suitable bar width is chosen and the input data is automatically averaged. There is also an option to produce a 3D version of the bar graph.

It is possible to directly control the number of bars plotted buy using the Xdiv keyword in your description file. You may want to produce a bar graph that falls over a certain time period, or for different items. In such a situation the x value will not be numeric – for the screenshot above, the x values are the four seasons. Here we assign four arbitrary numbers in sequence to the x values and label each bar using the XLabel keyword. You should keep the labels short so that the words do not merge on the x-axis.

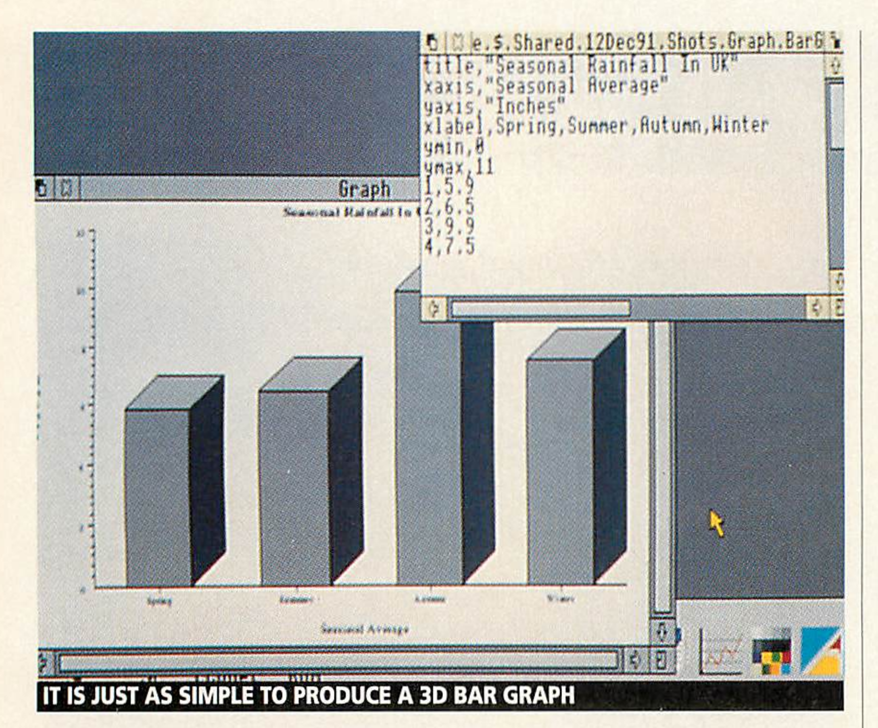
Graph automatically chooses values for the x and y axes that will maximise the size of the graph. You can overide the lower and upper values by using the Xmin, Xmax, Ymin and Ymax keywords, followed by the required values. Typically this is used to set the graph origin to



THE DATA TO MAKE A SIMPLE LINE GRAPH IS ONLY 11 LINES LONG

GRAPH KEYWORDS

Title	Title of graph
Xaxis	Label on x-axis
Yaxis	Label on y-axis
Xmin	Minimum x-value
Xmax	Maximum x value
Ymin	Minimum y value
Ymax	Maximum y value
Xdiv	Size of steps on x axis
Ydiv	Size of steps on y axis
XLabel	Labels bars on x axis
Newplot	Starts new graph
|	Comments



IT IS JUST AS SIMPLE TO PRODUCE A 3D BAR GRAPH

zero on each axis. The values cannot be used to clip the display – in this case the values will be ignored. The Xdiv and Ydiv keywords can be used to specify the number of labelled positions.

Three more keywords, Title, Xaxis and Yaxis, allow the axis to be labelled and a title added. The text is justified and drawn in an outline font. You can also draw multiple line graphs by entering each set of x/y values separated by the keyword Newplot. However, *Graph* does not support multiple 3D bar graphs.

Clicking the Menu button over the *Graph* icon produces the Save dialogue and various display options. Clicking Bar Graph on the Options panel switches to a bar graph display, which shows the average value for each bar. If you are using the XLabel keyword to label each bar, there will be one bar per pair of co-ordinates. If not, *Graph* will choose the bar width for you, unless you override this with the Xdiv keyword. The bar graph can also be displayed in 3D format by clicking on the 3D bar option. To complete the presentation, the fonts and font sizes for the title, x/y axis labels and the x/y scales may be selected from the Font menu list.

When drawing a graph for a DTP document, you will probably have a specific size of drawing in mind. *Graph* allows you to preview the graph at different print sizes, and it will automatically adjust the axis labelling to fit, ensuring that separate sections of text do not overlap.

To adjust the graph size click on Resize in the Options panel, then drag the Adjust size window icon, to alter the size of the graph window. The graph will be redrawn to fit the window, adjusting the axes as it does so. This is better than rescaling the graph within a DTP document as the text size remains the same while the labelling is adjusted to suit the size. To return to the default size click on the Full size icon. The size of the graph is displayed in inches in the information panel.

Graph tries to be truly WYSIWYG (What You See Is What You Get). It displays the graph on-screen in true printed size, unlike *Draw* which assumes there are 180 screen pixels per inch. The first line of PROCivar in the *RunImage* program sets variables sw and sh to the actual display size of the monitor when in mode 12. Alter these values in inches to suit your own monitor by measuring the size of a fully open *Edit* window for an example. Clicking True size in the *Graph* menu switches between true size and *Draw* size.

The description file for *Graph* is in a format known as Comma Separated Value (CSV). Some database and spreadsheet packages allow data to be exported in this format, which will save you having to retype the data in *Edit*. It is also possible to write a Basic program to create the data file. But instead of using the standard keyword `PRINT#` to write the output data, you must use `BPUT#..,string$`. This adds text in *Edit* format. For example:

```
f%=OPENOUT"Graphdata"
BPUT#f%,"Title,Sample data"
BPUT#f%,STR$(x_value)+","+STR$-
(y_value)
CLOSE#f%
```

Floating points and negative numbers are accepted, as well as scientific notation.

THE LISTINGS

There are three listings on the yellow pages. The first will create the application directory in the root of the current filing system. The second is the main application and should be saved as *!Runimage* in this directory, together with the third listing, which should be saved as *Wimplib*. The application can then be run.

As noted previously, the first line of PROCivar in the *RunImage* program should be set to the display size of your monitor – change this as necessary.

The program does not use the Draw module, since Draw files contain a lot of extra information which needs to be created and processed. PROCdoload handles the initial processing of graph data, setting the axis sizes and processing the keywords. The numeric data is stored in an array which you may need to enlarge if your graphs have a lot of values. PROCdrawg displays the axes and graph on screen, and works by reading the data from the data array and plotting it as it goes, scaling the values in OS units (pixels per inch). PROCdosave creates a graph in Draw format, and is, in effect, a modified copy of PROCdrawg with its own subroutines to handle the creation of the text and path draw objects. Ideally there should be only one dataprocessing routine but development was made easier by doing it this way.

The font plotting and drawing procedures can place the text in one of three ways: left justified, centred or right justified at the position specified. PROCrnd and PROCgrid perform the tricky business of automatic scaling — it is a lot harder than you think, especially if you want to avoid strange values.

The rest of the program is concerned with Wimp message handling, although most of this is performed by procedures in the library, *WimpLib*. Looking at the relationship between the two programs should allow you to use the procedures in *WimpLib* in your own programs.

Obviously, the main way to extend the program would be to add additional ways of displaying the data. Assuming that there is no need to change the axes, this should be fairly easy.

You will need to add a procedure for drawing on-screen and for producing the output file in *Draw* format. The other area with a lot of possibilities is to add additional options, such as displaying dotted horizontal lines to aid the reading of values, the highlighting of plotted points, and showing an axis line.

Procedures are supplied to create the Draw file components. To draw a connected line you start with PROCphdr(nxy%,...) where nxy% is the number of points in your line, including the start and end. Then you use a combination of PROCpthm(x%,y%), which is like a Basic MOVE, and PROCpthd(x%,y%) for a DRAW, where x% and y% are in Draw units.

There are 256 draw units to one OS unit – refer to PROCvar1 for the various scale factors used. The variables xd and yd contain the current value to graph, xsd and ysd are the scale factors to convert this into draw units, while adx% and ady% are the position of the axis' origin.

Adding a pie chart presents additional problems because Draw expects circles to be defined as Bezier curves but we would be interested to hear if you manage.

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SIGHT AND SOUND

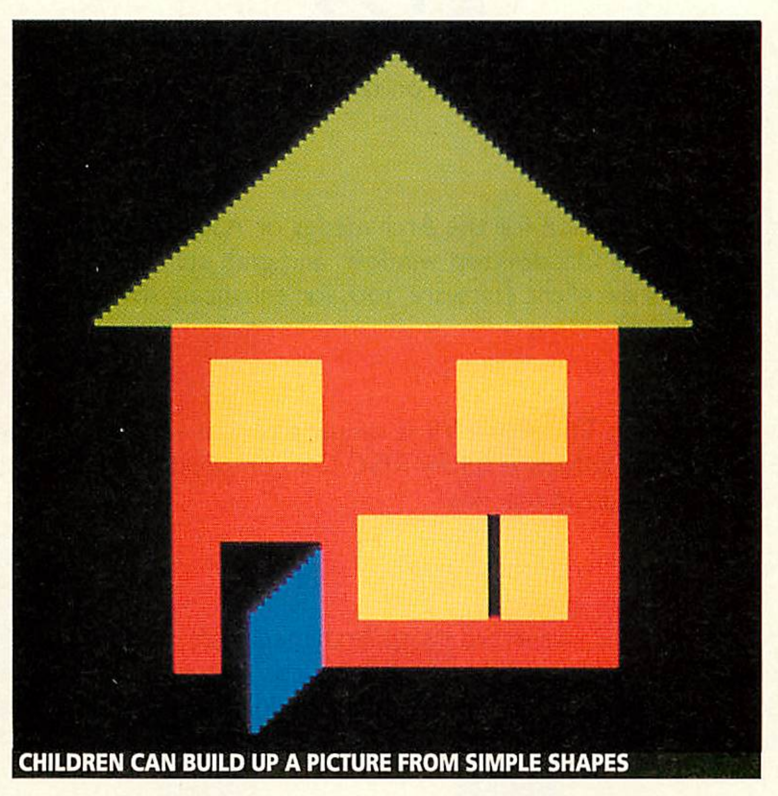
Making music, art for infants and even funny noises are all lurking in the eight-bit archives, as **DAVE LAWRENCE** found out

Over the years, a wide range of programs have been written for the eight-bit range and, to prove the point, this month's Pieces of Eight revisits some classic programs. They cover topics as diverse as art, music, mathematics and even printing sideways. As usual, all of these programs can be found in the Yellow Pages.

YOUNG ART

These days most art programs involve the use of a mouse or joystick and many complex drawing tools. Yet, young children often have difficulty getting to grips with this sort of complex user interface.

In the 'real' world, they paint their pictures using bold, bright and colourful shapes, making use of large areas of colours. In contrast, the computer world often expects them to use twiddly lines, dithered colour fills and airbrushes.


CHILDREN CAN BUILD UP A PICTURE FROM SIMPLE SHAPES

Not so with *Kiddie Art*. In *BAU* January 87, **John King** showed us that it is possible to produce a program that allows children to paint in a familiar way. *Kiddie Art* uses just two basic shapes – a square and a triangle, one of which can be moved around the screen at a time. When the user is happy with the colour, size and position of the shape, it is then fixed to the picture's background.

This way the screen can be filled with colourful pictures, that give children a sense of achievement and fun. In the hands of older children (not to mention the occasional adult) the program can be used to create complicated pictures, built up and constructed from the basic shapes available. Mode 2 is used to produce the pictures, for two reasons.

Firstly it allows the use of all eight of the Beeb's colours and secondly, by careful programming of the palette, shapes can be made to move over the background without disrupting the picture. John's original program was a little difficult to follow, so I've taken this opportunity to rewrite it. I've added meaningful variable and procedure names and these should hopefully make it easier to understand.

Using the program could not be simpler. When it is first run, you will be presented with a blank screen. Pressing S will bring up a square in the middle of the screen. If you want a triangle, press T instead. Your shape can then be moved around the screen using either the cursor keys or, if you prefer, you can use L, R, U and D.

The C key is used to change the colour of the shape – it will cycle through the eight colours available. You can increase and decrease the size of the shape with the > and < keys. There are limits imposed on the position and size of the shape but as these are very large, you are unlikely to run into problems.

Once you are happy with your shape, another can be added by simply pressing S or T again. The new shape can be moved or resized as before. When your picture is complete, it is saved to disc by pressing f3. This should be done when the final shape is in position, as saving

Shift-F								*The Music Editor*
Function								

will fix this last shape automatically. *Kiddie Art* files are not saved as screen images. As each shape is fixed, its position, colour and size are stored in a compressed form in memory. This greatly reduces the size of the disc files. Saved files can be reloaded by pressing f2. Once reloaded, they are quickly redrawn and more shapes can be added. Due to memory restrictions, you are limited to a total of 256 shapes for each picture file.

If you are using a machine with shadow Ram, or a Master, the value of max on line 70 can be increased quite dramatically. Because of the way the data is stored, pressing ESCAPE or BREAK by mistake does not matter. When the program is run it will examine the memory where it stores the data. If it detects valid shape data, it will redraw the stored picture.

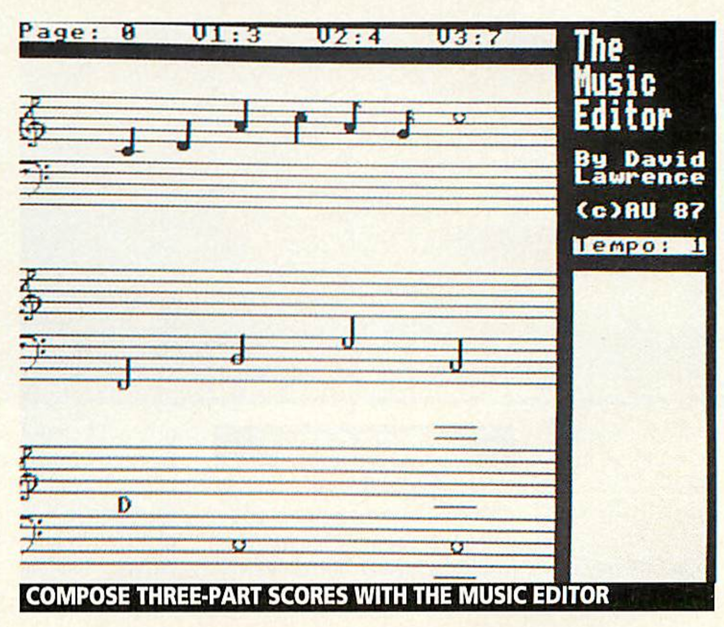
If you would like to add more shapes to *Kiddie Art*'s repertoire, you'll need to add extra keys to the in$ declaration and adjust the various numbers in PROCedit. You will also need to add the shape's name to the shape$() array and provide three functions to handle the shape.

The first function should be given the same name as the shape itself. This should draw the complete shape at (x,y) using size as a scale. Next you will need a function with the same name plus 'bit' added on the end. This should add an extra layer to the shape.

Finally, you'll need 'move' plus the shape name. This is called with a direction for left, right, up and down. This should redraw the appropriate bits of the shape, as it moves about the screen.

John did eventually opt for the acid test and let some children loose on the program. All of them enjoyed using it, although some were disappointed that there was no colour printer available to print out their results – a definite sign of the times. Most children were surprised at what could be achieved and became more adventurous and creative as they gained experience in using the program – making a challenge out of the apparent limitations of only two simple shapes. Here are some suggested uses in the classroom:

- A teacher can talk about translating the shape across the screen, introducing an idea that children can formalise later
- Overlapping squares and triangles shows how irregular areas can be built up from simple ones.
- Problems can be set, such as reproducing a previously constructed picture
- Children may want to set their own tasks



COMPOSE THREE-PART SCORES WITH THE MUSIC EDITOR

TABLE 1

f0	Demi semiquaver
f1	Semiquaver
f2	Quaver
f3	Crotchet
f4	Minim
f5	Semibreve
f6	Envelope change
S	Accidental sharp
F	Accidental flat
N	Accidental natural
O	Remove accidental
.	Switch on/off dotted note
Return	Sound note and move on
1-9	Select tempo
Tab	Play tune
Space	Stop playing
Delete	Delete current note
I	Insert before current note
@	Filing menu
P	Dump screen to printer

TABLE 2

Byte	Function
0/1	Pointer to voice one (6)
2/3	Pointer to voice two (i)
4/5	Pointer to voice three (j)
6...	Voice one data
i...	Voice two data
j...	Voice three data

THEME TUNE

Modesty is all very well, but this program – written by a certain famed *BAU* writer – was just too good to leave out. *Theme* is my own music editor that first appeared in *BAU* April 87 and allows you to edit three-part musical scores, as shown in the screenshot opposite.

It was written to overcome many of the problems of *Tunemaker* – a single channel music program. *Theme* comes in two parts: the first defines characters and envelopes and assembles a short piece of machine code, while the second part of the program is the music editor itself. To use the program, you will be asked for a key signature which should be entered as the number of sharps or flats, followed by S or F. Pressing RETURN means that there are no sharps or flats in the key signature.

The main edit screen will then be drawn. This shows all three voices at once, each containing one note. The edit cursor is shown in the top left hand corner and represents the range of pitches available, two octaves above and below middle C. Although key signatures are catered for, time signatures and bar lines are not. Accordingly all accidental sharps, flats and naturals must be included every time they occur.

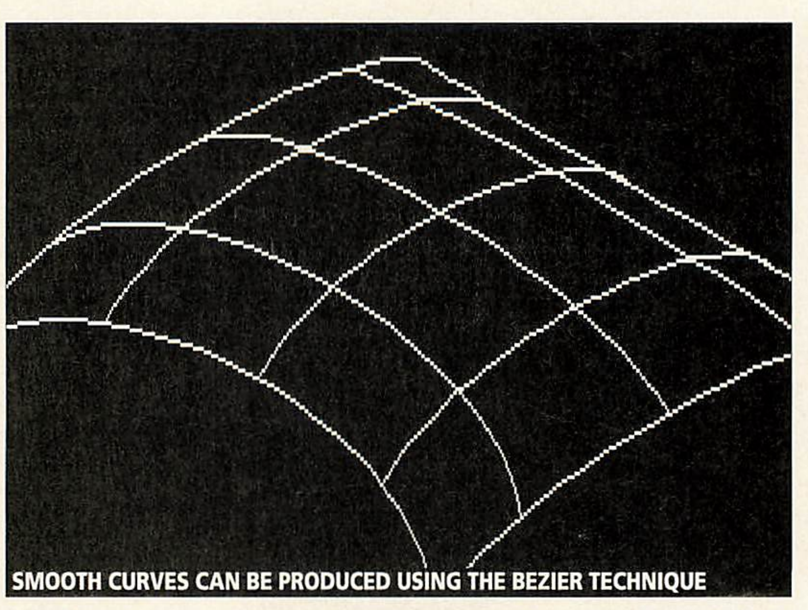
The left and right cursor keys move the edit cursor left and right, and SHIFT left and right move it one screenful (eight notes). The up and down cursors change the pitch of the current note by moving it up or down the stave. To move between voices use SHIFT up and SHIFT down. The note length is selected with the function keys (as shown in the above keystrip) and dotted notes are obtained by selecting the note and pressing the full stop button. Pressing it again will remove the dot.

Accidentals are obtained with S for sharp, F for flat and N for natural. Pressing O will remove an accidental accidental! Rests are obtained by pressing SHIFT plus a function key. If you press RETURN and the current note with play, the cursor will move right and a new note will be automatically added of the same pitch and duration as the one before. Gaps can be left at any point on a stave, so there can be fewer than eight notes on a page. This enables you to line up notes correctly. Other control keys are shown in table one.

All voices are initially assigned envelope one, which can be changed during a tune by pressing f6. This will insert an envelope change, the letter between the clefs of the stave indicating the new envelope – A for 1, B for 2 and so on. The

envelope can also be changed with the up and down cursor keys. To change the envelopes back to notes or rests, use the correct function key.

The @ key will take you to the filing menu. From here you can load and save tunes or quit the program. Options one and two are complementary – you can reload a tune saved with Save. Final will save the tune in a special format that can be played with a simple piece of Basic or machine code. However, you can not load a Final tune back into the editor.


SMOOTH CURVES CAN BE PRODUCED USING THE BEZIER TECHNIQUE

In the same issue my accomplice, **Dave Acton**, introduced the *Autumn* file format. This format allows you to create music, using the editor, that can be played back using a completely separate routine. The format of an *Autumn* file is shown in table two on the previous page.

There are three programs on the yellow pages that know what to do with an *Autumn* file. The first, *PlayBas*, is the easiest to follow and merely plays a file from Basic. The other two, *StarPLAY* and *StarEVENT* assemble machine code routines that will play a file in the foreground or background (under events) respectively. Both routines assemble at &0900. Using the commands should be self explanatory.

Finally on the yellow pages you will find *Create* – this contains all of the data necessary to create a sample *Autumn* file that can be played by any of the above routines. Apologies to J S Bach.

A BIT ON THE SIDE

Flicking through the rest of *BAU* April 87, I came across this rather handy printer utility from **John Knight**. It allows text to be printed out sideways, so that very wide output can be produced. John originally wanted to use the program with *ViewSheet*, to print out wide spreadsheets. However, it could be of benefit to any program that produces output in a text file. From *View* you could either *SPOOL the output from the SCREEN command or, better still, use Graham Bell's *View Spooler* that reappeared in Pieces of Eight, *BAU* May 91.

John's program will work with an Epson compatible printer that supports ESC "L" (120 dpi graphics) and ESC "A" linefeed. Files of up to 20K in length can be printed. If you have a printer that can handle paper wider than eight inches, set the value of maxdots (in PROCsetlimits) to 120 times the width of your paper in inches.

This will give you more than the standard 96 page length. To use the program, simply RUN it and enter the name of your text file. The entire file must be loaded into memory at this point, hence the limitation on the size of the file. The program will then ask you if you want the output in double height. This is much easier on the eye but it will, of course, halve your page length. The text will then be printed in graphics mode, in other words the Beeb's own character set is used, so all your defined characters will come out as well. Currently the program expects the printer to perform automatic line feeds with each carriage return sent. If this is not the case for your set-up, then you should change the two VDU 1,13 commands found in the DEF PROCreadfile to VDU 1,13,1,10.

VOICE DATA

The data is made up of a stream of bytes, with the program primed to look out for the following values, which are followed by the related data.

Byte	Meaning + data
0	Rest + 1 byte to denote the duration
1-239	Standard pitch + 1 byte duration
240-253	Reserved but not used
254	Envelope + 13 byte definition
255	End of voice data + &FF

AT A TANGENT

Now, for a bit of clever mathematics, here is a piece that was originally published in *BAU* September 88. **George Blanchard** showed us how a few calculations could create smooth curves on a computer. Of course, in these enlightened days of Risc OS and *Draw*, we know all about Bezier curves, but this piece was actually featured before their release.

Named after Pierre Bezier, a Bezier curve is a particular form of a spline curve, originally designed for use in car body manufacture. However, their use has now migrated into object orientated drawing programs, such as *Draw* and the outline font systems used by the Archimedes or PostScript.

The idea behind all splines is parametric equations. Conventionally the parameter t is taken to vary between 0 at one end of the curve and 1 at the other. The x co-ordinate of a point can be represented by a formula such as:

$$x(t) = a_0(1-t)^3 + a_1t(1-t)^2 + a_2t^2(1-t) + a_3t^3$$

In this equation, there are four coefficients, a_0 to a_3. Similar equations can be constructed for y and even z using, say, b_n and c_n as coefficients. With a little maths it is possible to find that

$$a_0=x_0,\ a_1=2x_0+x_1,\ a_2=2x_3+x_2,\ \text{and}\ a_3=x_3$$

where x_0 and x_3 are the co-ordinates of the start and end points of the line, and x_1 and x_2 the co-ordinates of two control points which describe the shape of the curve. They define the tangents to the curve at the two ends. Listing *Curve* shows the sort of thing that can be achieved. The end points of the curve are fixed at the sides of the screen, but you are invited to enter co-ordinates for the two control points. With *Draw* you can experiment in real time, but this does show that it is possible to see smooth curves on an eight-bit machine.

Bezier surfaces can be explored by a simple extension of these rules, and *Surface* shows such a surface from different viewpoints.

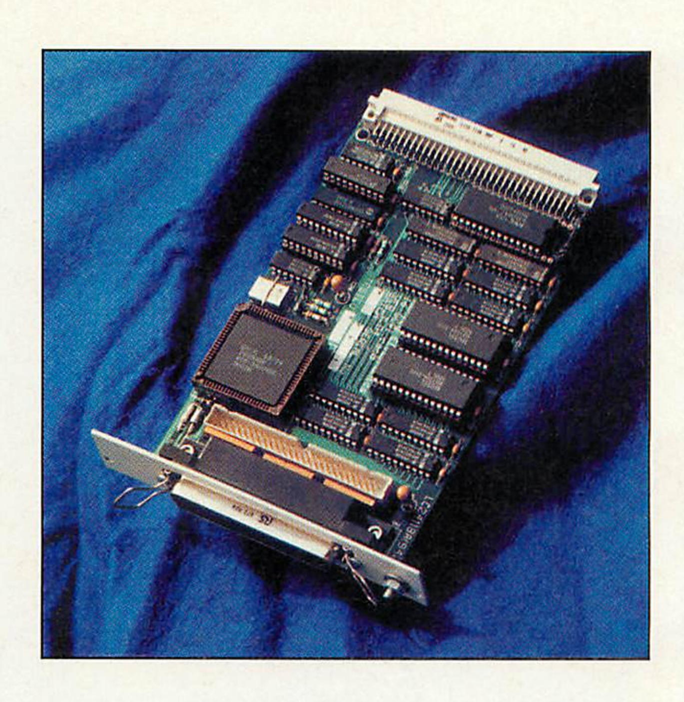
ONE FROM THE VAULTS

If you harbour fond memories of a television series called *The Clangers*, this program is guaranteed to produce waves of nostalgia!

It is a simple one-liner we came across, and there is not a great deal to say about it – just run it, close your eyes and imagine that you are on the moon.

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SCART TO FINISH

My Archimedes 310 is something of an oddity. Instead of using a normal monitor, my machine is connected to a familiar household object – the television set.

This is a standard Sony 14in Trinitron colour model, which happens to be working as an RGB monitor. By pressing the video/TV button on the television set, it switches between normal television programs and computer output.

The picture is not quite as crisp as a standard monitor, which has a smaller dot-size, but the colours are slightly brighter. Even in 132-column modes, like mode 16, it is quite possible to read text. Only special-purpose modes, such as those supplied with *Impression*, are too big to fit on the screen. In other respects, it is the same as using a standard RGB monitor.

This is all achieved via the Scart socket on your television set. But, sadly, it isn't quite that simple. If you try to use a standard Archimedes lead to connect to the Scart socket on a television, you will normally get a blank picture, even with the television switched to video input. The special lead needed is the same as a standard lead, with the addition of a connection from pin five, at the Archimedes end, to pin 16 of the Scart plug (see figure one).

The Archimedes A310 requires an additional change, in order to obtain the required switching signal in pin five. This is achieved by adding links between two easily-reached points.

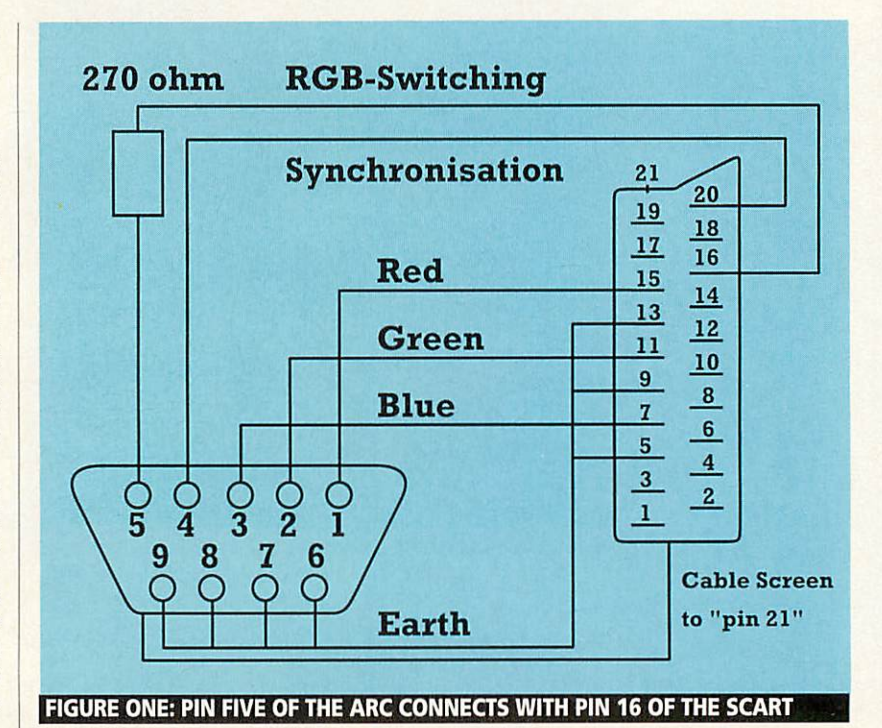


FIGURE ONE: PIN FIVE OF THE ARC CONNECTS WITH PIN 16 OF THE SCART

PATRICK McTIERNAN explains how easy it is to connect your Archimedes to a television set

THE THEORY

There is a standard way to send audio, video and RGB-video signals between TVs and other equipment – this is known as the Scart standard. The Archimedes RGB and synchronisation signals conform to this standard and an ordinary monitor is connected in this way.

However, the problem with using the Scart socket on a television is that, unlike monitors, most television sets need a signal between one and three volts on pin 16 of the Scart connector. This signal switches them from the composite video mode, used by most video recorders, to the RGB mode used by the Archimedes output.

Scart pin 16 is not connected in standard Archimedes monitor leads and, to make matters worse, the 13mA current required on this pin is not available from any of the pins on the built-in Archimedes video socket.

So, to supply the signal you have to use pin five of the video socket, which is not normally in use. However, the signal from pin five on an A3000 is not strong enough and this is why links are needed. Link 25 inside the A3000, or link 11 in the A310, allows pin five to be connected to various synchronisation signals.

Take the case of the A3000 first. In most machines this link will not be closed, but in the A3000 it is easy to do so – just ensure that the jumper is over both pins. If you have already moved things around inside your A3000, you may need to move links back again.

The A310 presents a slightly different situation. Closing the same link will not produce a strong enough signal, as all the output signals are at very low levels – half those of the A3000 or 400 series. This means that you have to join the link from a source that provides 5V to the centre of link 11 by soldering a piece of wire between the two. A good example of the former

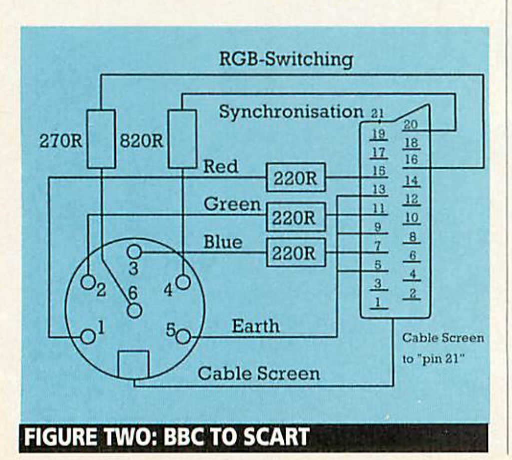


FIGURE TWO: BBC TO SCART

is the end of resistor R44, nearest to the back of the machine. Link 11 is then connected to pin five of the video socket.

For both the A3000 and the A310, a resistor of 270 Ohms is used to limit the current in the lead to the appropriate level (see figure one). You may prefer to remove the disc drive in the A3000 to gain access to the link, but it isn't essential. Access is easier in the A310.

So what about the lead itself? Some makes of standard Archimedes lead have spare cores in the cable, which may be used to make the additional connection in the lead. However, this is certainly not true of Acorn leads, and it may well be necessary to make up your own.

INTO PRACTICE

All you need to make the lead can be obtained from Maplin, whose current catalogue has a description of the Scart standard. The average cost for the simple Archimedes RGB lead is around £3.25.

Alternatively, you may be able to contact a dealer who can supply a lead and will also modify your machine if you wish.

The leads should be as follows. An RGB lead should be made with screened cable – for example, the Maplin XR26D six-core cable. Video-only leads should use 75 Ohm coaxial cable – for example, the Maplin XR88V miniature Coax. Finally, the audio leads should use screened cable.

Scart plugs are made-up by soldering or crimping the pins on to the wires first, folding the metal tabs around the wire ends and then clipping them into the plastic core, before assembling the plug. A point to note is that pin 21 on the scart plug is a bit of a fallacy. This pin is actually wedged between the plastic core and the metal shield around the plug – it sounds strange but it works. Cables will function without the screen, but this may lead to radio

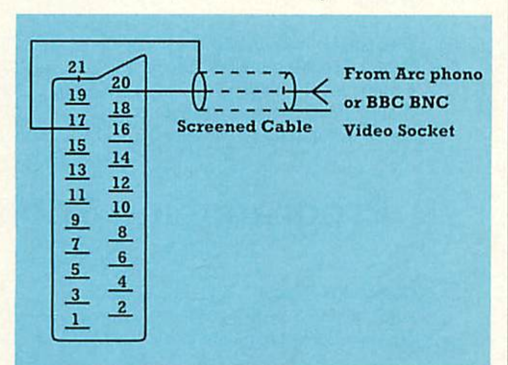


FIGURE THREE: MONO VIDEO TO SCART

interference and static-damage to your computer or television – you have been warned!

Once you are ready to use your lead, just plug it in and select video input on your television. On some sets, you just press a button – on others, you have to select a particular channel.

Some sets provide no switching options and the Scart connector does provide pin eight – this connection should allow the computer to take-over the television, ignoring the channel or any other selections. This needs a supply of 9.5V or more – a voltage which is hard to come by in an A3000. However, you could be lucky – the aforementioned Sony switches at just 7V.

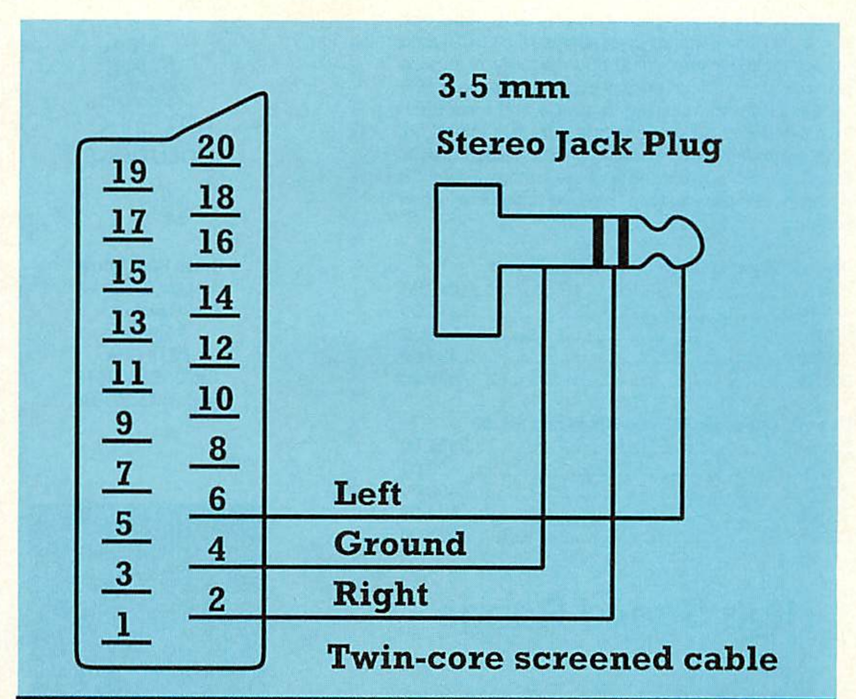


FIGURE FOUR: THE SCART CONNECTOR CAN ALSO SEND AUDIO SIGNALS

PROBLEMS

Some TV sets do not supply all of the required RGB Scart connections. A small number of sets use the Scart connector exclusively for sound.

In this case, it will be of no help to you (other than to connect the sound to) and you will have to use an RGB-to-UHF adaptor, available from most dealers. This will, however, give a lower picture quality than that obtained from a video or RGB link.

Some sets only have video input and output from their Scart connectors, and no RGB connection. In this case, the much simpler connection is shown in figure three.

This will give no colour from the Archimedes and no colour from the BBC unless the connection at link 39 is made. This link is quite hard to reach and has to be soldered; it is important to get someone with soldering skill to make it.

Any dealer experienced in upgrades or repairs to BBC machines should know how to do this. The colours are less sharp than those obtained using an RGB.

WARNING!

Users who are not sure about electrical connections should not proceed but should contact their local dealer for advice.

If you are determined, you may get a current of 9V from the serial chip, since very little current is needed at this pin. However, this may not be wise and, anyway, not everyone has the serial chip fitted. It can also be generated from the 5V supply by a simple voltage-doubler circuit, similar to that used by the serial chip. Another option is to use a 9V battery.

Finally, let's not forget about the Beeb. It is equally possible to connect a television set to a BBC micro and figure two shows the connections. As you can see, several resistors need to be .p77put into the Scart lead to reduce the high output of the BBC to an appropriate level. This is easily done within the Scart plug, with the resistors connected directly to the pins of the plug. It may be wise to put some sleeving around them to stop unwanted connections.

I have been using my television in this way for many years without any ill effects. If you try it, do bear in mind that many commercial leads do not contain enough resistors. This can pose a hazard to some televisions, and impose an unnecessary load on the Beeb's power supply.

SOUND CONNECTIONS

The Scart connector can also be used to send audio signals to the television. This means that you have more than one wire going to your Scart plug and figure four shows how to connect the headphone socket on an Archimedes, or the audio-output from a BBC, to the Scart.

BBC users have more of a problem – audio output is only available from the connection at PL16 at the front-left of the machine. This can be brought out to either the Econet DIN socket, or to a new jack socket in the unused hole in the back. (This is found next to the label 'RST SW' on the main board).

Both of the connections from the Scart plug, as shown in the diagram, should be connected to the BBC output, perhaps via a single cable. Again, your dealer should be able to advise on any relevant connections.

Worra Winnies

An Impressive combination of quality SCSI hard disc drives combined with our best selling 16 bit SCSI card to give superb performance and reliability at a price you can afford. All drives are supplied with controller card, cables and mounting hardware and have been fully tested and set up to be ready to plug in and go. Free software already installed on the drives includes Disc Tree backup software and the famous Euclid 3D package. Please specify type of machine when ordering.

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200Mb	875.00

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Our high speed drives come with a 24 month guarantee and offer superior performance. They are particularly suitable for important 'disc intensive' tasks such as fileserving and are ideal for use with Acorn's Level 4 fileserver software. Drives are supplied with our 16 bit SCSI card and are ready to plug in and go.

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50Mb	479.00
100Mb	649.00
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Our tape backup systems are supplied with superb desktop software to allow easy and versatile backing up and restoring of data from all types of hard discs, networks etc. We offer three ranges of streamer with capacities from 20Mb to 1Gb. The low cost cassette based range, the High Speed DC600 based range and out top of the line Elite DAT unit for professional applications.

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A3000 upgrades

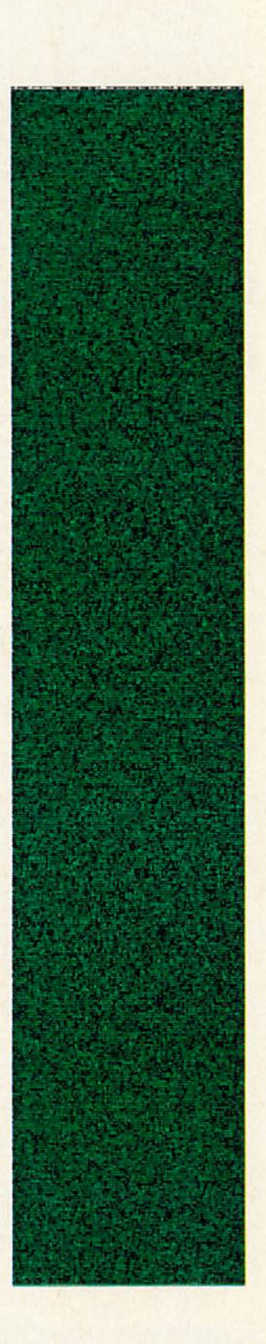
We offer an extensive range of A3000 upgrades, with RAM cards giving 2Mb or 4Mb, and combinations of user port, analogue port and floppy disc buffer fitted on an internal A3000 mini podule card.

2Mb RAM card	65.00
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Multi-Media Software

Our Genesis family of software is the best selling range of multi-media software on the Archimedes and is widely acclaimed for its power and ease of use. Genesis Plus is a new addition to the range combining many of the new features of Genesis II with the inherent simplicity of the original Genesis I.

Genesis Plus	69.95
Genesis Plus + Oak Recorder Sound Sampler	95.00
Upgrade Genesis 1 to Genesis Plus	46.95
Upgrade Genesis 1 to Genesis 2	74.95
Upgrade Genesis Plus to Genesis 2	74.95
Genesis II	130.00
GenIndex	29.95

CAD Software

As leaders in CAD software on the Archimedes, our range of CAD products have become famous for being real tools for real world jobs. Oak PCB, just released, is a powerful new desktop PCB design package, designed to be similar in operation to !Draw, with all the power to cope with anything from simple single sided boards, to complex multi-layer boards with outputs via Risc OS drivers to a wide range of printers and plotters.

Parametric Design Tool	359.00
Worra CAD	99.00
KiddiCAD	99.00
Oak PCB	150.00
Arcsign	80.00
Worra Plotter	29.95

Econet Software

Our expertise in networking on Archimedes is unrivalled, and we have a range of products to enable to get the most out of your network. ClassROM is a combination of software and hardware that removes the load of application serving from the network and allows machines to be remote controlled from one station. ClassPrintLD allows Computer Concepts' Laser Direct printers to be used as network printer servers.

Disc Sharer (network licence)	137.50
Printer Spooler (network licence)	81.25
Econet Level 4 fileserver	199.00
ClassPrintLD (network licence)	75.00
ClassROM (software/hardware)	POA

Programming Tools

Cambridge Pascal	69.00
ABC version 3 BASIC compiler	69.00
Genesis Script Language Book (no VAT)	14.95

Sound Sampling

The Oak Recorder sound sampler is a low cost way of getting high quality sound samples into your software. The microphone (supplied) simply plugs into the printer port of any Archimedes machine (including A3000s) and the software allows samples to be captured, edited, and transferred to a wide range of software packages. Oak Recorder integrates particularly well with Genesis Plus and Genesis 2, which have inbuilt commands to both capture and play samples from the Oak Recoder.

Oak Recorder	29.95

WORK OF ART

ROB MILLER continues our series on Archimedes applications by looking at the popular graphics package, Artisan

Computer graphics is one of the most popular areas of computing and the Archimedes is ideally suited to the task, because of its high quality graphics capability.

Artisan from Clares Micro Supplies was one of the first 16-colour art programs to appear for the Archimedes and has become a popular choice. Given some artistic know how, anything from simple squiggles to works of art can be created with the package.

Since its original incarnation, *Artisan 2* has been launched and includes a few minor changes to the original. However, the two programs are very similar in use.

GETTING STARTED

Artisan 2 comes on two discs, one containing the program itself and the other featuring a selection of Risc OS printer drivers and a few example pictures. If you have a hard disc, it is best to create a new directory (such as Artisan2) and copy over the contents of both discs.

Artisan 2 is loaded by double clicking over the relevant icon. A simple protection system then requires a numeric code to be entered to prevent unauthorised copying of the software.

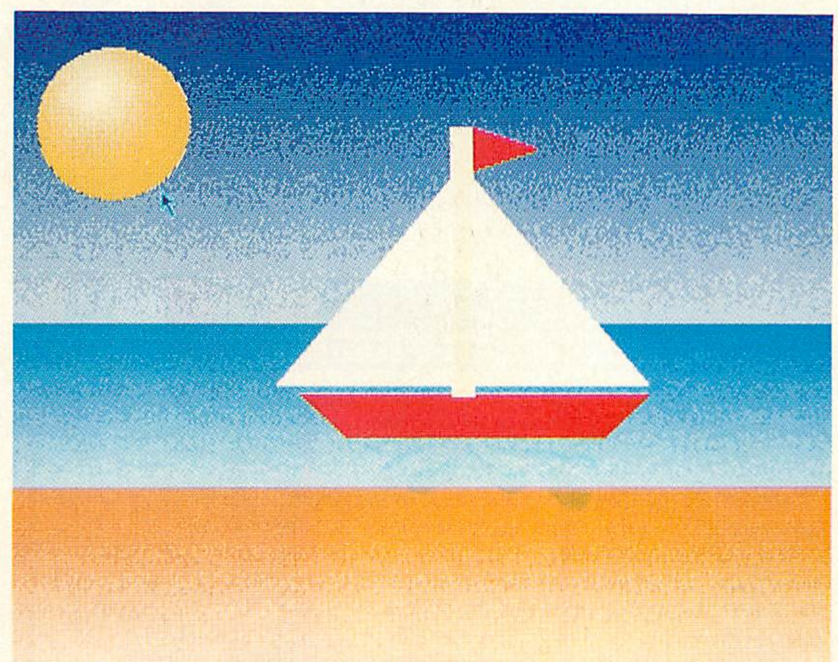
Once *Artisan 2* is loaded, it installs itself on the icon bar in the usual Risc OS way. It does not operate in the desktop, but follows the WIMP (Windows, Icons, Menus and Pointers) operation. The reason the desktop environment is not used is to allow the entire screen area (less grey borders) to be utilised.

Clicking on the *Artisan 2* icon clears the screen and gives an empty white background. The main *Artisan 2* menu is displayed, from which you can access all features.

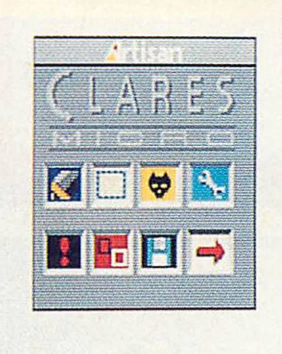
ON THE MENU

There are eight options available on the main menu and these are represented by small icons. On the top line are the Drawing menu (pencil), which contains all the tools to draw on screen; the Shapes menu (blue square) which allows single lines, squares, triangles and so on to be inserted; the Sprites menu (cat) for controlling sprites, and the Special Tools menu (spanner), which enables image manipulation.

On the bottom line are: the Help window (exclamation mark), which has a similar function to the Help application provided on *Applications Disc 1* with the Archimedes; the Area menu (black and a white square on a red background) from which any rectangular area of the screen can be moved, copied, shrunk, enlarged or rotated; the Filing option (floppy disc), and the Exit option (arrow pointing right) which allows the user to exit from *Artisan 2* to the Risc OS desktop.



THE COMPLETE PICTURE – CREATED USING ARTISAN'S BASIC TOOLS



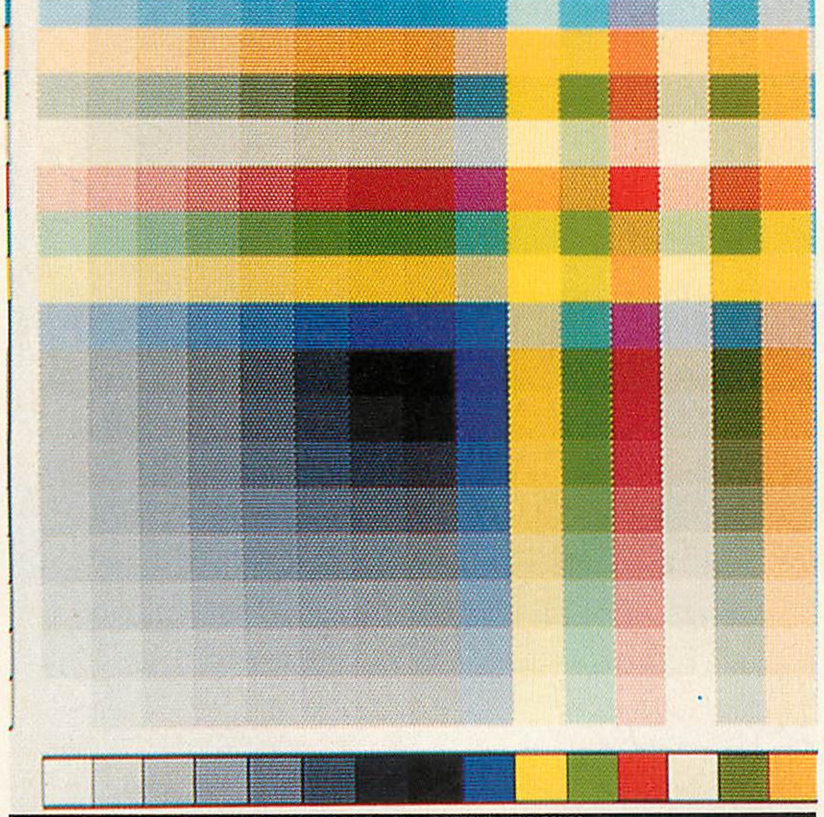
OPTIONS ON MAIN MENU

At first, *Artisan 2* appears quite restrictive, in that it only has a palette of 16 colours. But, with a bit of cunning, colours can be mixed to give the impression of a much greater range.

Dithering colours involves placing different coloured pixels together in a kind of chess board arrangement. Because a single pixel is quite small, the effect is to merge the two colours together. The screenshot overleaf shows a 16×16 palette with all the possible combinations.

The two lines of colour along the x and y axes help to show what colours are being mixed. For example, if you need to find out what red and yellow look like mixed together, find red on the y axis, yellow on the x axis and at the point at which they cross, you should see orange.

Scales of colours are also possible with dithering by mixing any colour with the grey scale in the palette. Quite reasonable shading is therefore possible – fortunately, *Artisan 2* has a number of tools to help you mix colours.


THE PALETTE OF 16 COLOURS CAN BE BE MIXED EASILY

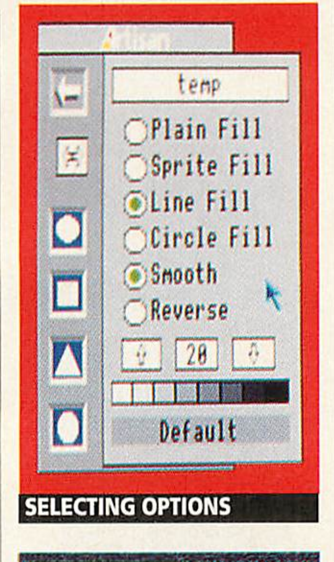
The best way to get to grips with the program is to work through a few examples that use more complex tools. Before doing anything else, select red on the Palette submenu on the Drawing menu. Clear the screen by going back to the main menu and selecting the screen icon on the Tools menu. The screen should change to red. Clearing the screen with the clear screen tool will always fill the screen with the currently selected colour.

Shading is good for giving a sense of depth to a picture, so a landscape makes an ideal subject. It is worth starting with the horizon to help positioning. You can either draw the sky with a single rectangle, or by drawing a line and flood-filling the top of the picture. (Flood filling means filling a shaped area with a new colour).

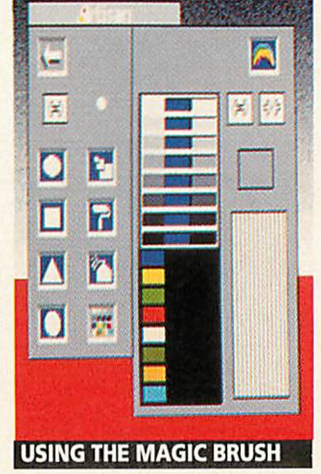
To achieve a graduated sky, select the line tool from the Shapes menu and draw a line from left to right, roughly in the middle of the screen. Make sure you have selected a new colour (white is ideal) from the palette, otherwise the line will not show up on the screen.

Now go to the Drawing menu and select the paint roller, known as the Fill Option. If you have the Help window switched on, you will notice that pressing Select over the paint roller icon gives another submenu. For the moment, just select Line Fill and Smooth by clicking the pointer over the two corresponding options.

Line Fill works by drawing a line on screen to indicate the direction in which you want the fill to proceed. A vertical line will result in a fill from left to right (or right to left depending whether you select the top point of the line before the bottom point). A horizontal line will fill the area from top to bottom (or bottom to top). A line drawn at any other angle will give a diagonal fill.



SELECTING OPTIONS


USING THE MAGIC BRUSH

Now draw a line just above the first line, using the tip of the paint roller pointer to indicate the beginning and end points. You should get a smooth grey scale, going from white at the bottom to black at the top. Using *Artisan 2*'s magic brush tool, the grey scale can be changed to a grey scale dithered with blue to give a blue scale for the sky.

The magic brush is usually used to change one colour into another. It can also be used to change one colour into a dithered mixture of any two colours. To select the magic brush, click the pointer over the magic brush icon (the rainbow at the bottom right).

Two columns will be displayed: the first shows the colour to change from, and the second the colour to change to. Pairs of colours that are outlined in a white box are active.

By changing each grey in the grey scale to a mixture of grey and blue, a blue scale can be produced. Click Adjust over the rainbow on the magic brush window and the two columns will change to three.

The second and third columns show the two colours that make up the dithered pattern. Make sure all of the grey scale is active by clicking Select on the relevant box in the first column and then changing all of the middle column to dark blue. Colours can be cycled backwards and forwards by clicking Select or Adjust.

You are ready to recolour the grey scale. Move the magic brush pointer over the sky part of the picture and press Select. Move the pointer over the sky until it is completely blue.

You might notice that moving the pointer over the red part of the screen has no effect while Select is pressed – this is because red is turned off in the magic brush window. If the screen is left in white, this makes it difficult to obtain a straight horizon.

NAUTICAL, BUT NICE

As the picture is going to have a nautical flavour, add some sea, with a light blue scale, and a beach, using orange for the scale.

Don't worry if you make any mistakes – you can always start afresh. If you get to a point where things could go wrong, and quite a lot of work has been done already, save the picture to disc. You can then load the half finished picture and work from that.

While on the subject of filing, now is a good time to save what you have done so far. Go to the main menu and then choose the Filing menu – click on the floppy or hard disc icon, depending on which one you intend saving to.

A large window will be displayed, showing the files available on the currently selected filing system. Saving the current picture is just a case of clicking over the screen save icon (three monitors) whereby a small copy of your screen will be displayed.

Type in the name that you want to call your picture (for example, Seaside) at the caret and click Select over OK to save the screen.

You can add a sun to the picture by drawing a yellow circle somewhere appropriate in the sky area using the circle tool from the Shapes menu. Make sure you remember to change the colour to yellow before drawing the circle, or it won't look much like a normal sunny day.

You may like to try filling the circle with a graded fill to give it a more solid look. Select the Flood Fill submenu as before, but this time select Circle Fill instead of Line Fill. Clicking the pointer in the top left part of your circle will give a series of concentric bands of grey, emanating from the point at which you pressed the Select button.

If the bands are too wide or too narrow, press Adjust – this should undo the last operation and, in fact, works with most tools in *Artisan 2*. Change the band width by clicking Select over the up and down arrows. Finally, change the grey scale in the circle to yellow.

GETTING SPRITELY

The next thing to be added to the picture is a yacht. Rather than draw the yacht on to the existing picture, it is far easier to start on a new, blank screen and import it. (Importing a sprite involves copying it from one screen to another).

Make sure your original screen is saved as explained earlier, then clear the screen to green. Green is chosen for the background as it will not be used in the yacht.

In order to get a 'balanced' yacht, the gridlock tool can be used to ensure that all the lines are joined up and the shapes fit together correctly. Gridlock is basically a method of dividing the screen up into a grid, where each square is larger than a single pixel.

Artisan 2 allows grid rectangles to be anything from two pixels wide or high, increasing each time by a factor of two. Move to the shapes menu and click Adjust over the top right icon. A gridlock submenu should appear.

Change the height and width values of the grid to four by clicking Adjust over the arrow icons. You will also have to turn on the grid by clicking on the top icon.

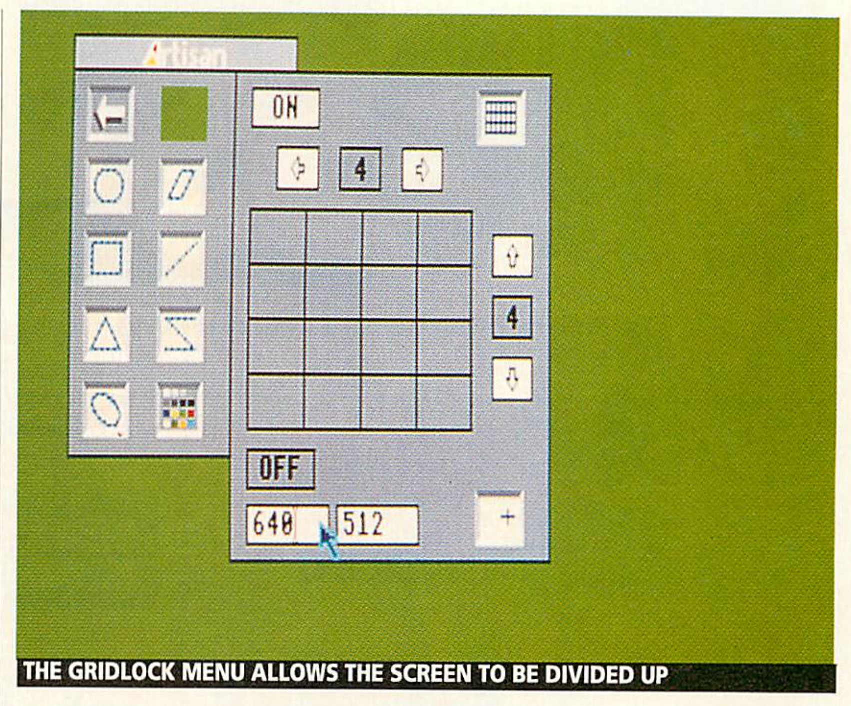
Now select red from the palette and, after selecting the rectangle icon on the Shapes menu, draw a small rectangle lengthways on the screen. This will be the hull of the yacht. Now select triangle from the Shapes menu and add a triangle to each end of the rectangle. You should find it easy to position the points of the triangle with gridlock turned on.

Add a mast to the yacht by drawing a thin rectangle in cream on top of the hull. You will first have to change the gridlock x and y settings to something smaller in order to get a thinner grid. Draw some white sails on the mast with the triangle shape and, finally, add a small red triangular flag to the top of the mast. The complete yacht can now be transferred over to your original sea background.

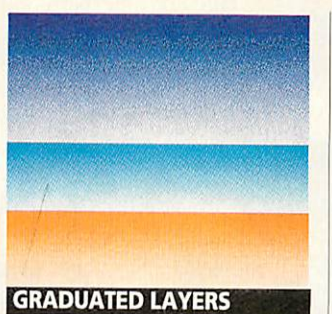
Go back to the main menu and then to the sprite menu (the small black cat icon). To cut out the yacht (without the green background) so that it can be overlaid on the sea, use the transparency option in the Sprite menu.

Click Adjust over the X icon and a small window will pop up showing the current palette. Each colour can be made solid or transparent by clicking with Adjust over any square. Then if you click on the green square – a white box around the square will show that particular colour to be transparent.

Now select the grab sprite icon (black cat inside a red square). Click Select at the top left



THE GRIDLOCK MENU ALLOWS THE SCREEN TO BE DIVIDED UP


GRADUATED LAYERS


DRAWING THE YACHT

ONE STEP BEYOND

- The ideas given in this article should give you the basic skills and encourage you to progress further. To get the most out of a program such as Artisan 2, try different drawing projects and generally doodle.
- If you would like to pass on any hints or tips on using Artisan 2, please send them to: BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ
- Artisan 2 for the Archimedes costs £61.95. Contact Clares, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA. Tel: (0606) 48511

point from which you wish to grab and then move the pointer to the bottom right point. Notice that a rectangle is drawn as you move the pointer to show the area to be grabbed.

Click Select again at the bottom right point and the yacht is selected. To make sure you have grabbed the right area, select the store sprite icon (an arrow pointing upwards to a white square). The new sprite should be displayed in a green-bordered window.

If you grabbed all the yacht as a sprite, type in a name for it, such as Yacht. If not, try grabbing again. Don't forget you can make the banding box bigger than the yacht, since the green background will be left out.

Now save the yacht sprite before loading back the original seaside picture. Go to the filing menu and save the sprite. This is similar to saving screens except you click select on the save sprite icon – the three black cats.

The yacht sprite will remain in memory even when loading a new screen, but it is always a good idea to save sprites (or screens) when you have finished them.

FINAL STAGES

The final step is to combine the yacht sprite with the background. Load in the original screen (Seaside), by just clicking on the word Seaside underneath the save screen icon. Click Select over OK to confirm the loading.

To load the yacht, go back to the sprite menu and select the select sprite icon (an arrow pointing down from a white box) and choose the yacht sprite. The yacht, minus the green background, will appear at the pointer. Move the yacht until you are happy with its position and press Select.

You should now have the finished picture, complete with yacht, sea, sand, sky and sun. In the process of putting the image together, you should have grasped the basic principles of using *Artisan* and, who knows, you should be able to step up to being a fully-fledged Archimedes computer graphics fan.

Chess3D

(requires RISC-OS and 1Mb memory)



"QUALITY ARCHIMEDES SOFTWARE FROM MICRO POWER – the Publishing House that brought you over 70 superb programs for the BBC Micro and over 40 for the Acorn Electron".



The Display. Single-screen presentation with superb 3D graphics, using shading and vanishing point perspective. Board rotation at any point in the game and additional icon-type board for quick moves. Moves and responses are listed in a window allowing review of the game so far.



Options include player v computer, player v player and even computer v computer. A book of standard openings is available, to which you may add if you wish. Learners can cheat by taking back moves or even reversing sides with the computer. A part game can be set up to aid analysis of particular problems.



The program is fully integrated with RISC-OS multi-tasking and windowing system. For instance, you can close down the main window after moving, work on some other application, and then return to find your chess game has been progressed.



As you would expect all moves are validated and the program accommodates Castling, 'En Passant' and all-piece promotion. Full advantage has been taken of the speed of the Archimedes.

TRIAL OFFER

Cut-down version of program (player v player only) available at £2.95 to enable you to experience the graphics. This is completely refundable against purchase of the full game.

AUTHORS

If you have written or are writing Archimedes software of commercial standard and are seeking a Publisher please write to Bob Simpson at the address given, preferably with a working sample of your program.

Cheques/P.O's payable to MICROPOWER





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TIME MACHINE

A computer can be a school's time machine, helping pupils to investigate historical sources. It can help to answer pupils' enquiries and is also a useful way for them to display the results of their studies.

There are benefits in combining IT (information technology) and history. Using IT in history topics can help children to empathise with people who are remote, both in time and geography. But this is a two-way process.

History can also help to develop children's abilities in IT covering at least four of the five strands described in the National Curriculum guidelines – these are communicating information, handling information, modelling, applications and effects.

In spite of this, the history orders of the NC do not seem to encourage the extensive use of computers. What is suggested falls far short of the potential contribution. This is illustrated by the barchart reproduced from HM Associates' *MapIT* (see page 84), where a *Genesis II* application graphically illustrates the gap between what is expected and what is possible.

For Key Stage One, the non-statutory guidelines suggest the following. The most imaginative idea to use overlay keyboards to explore pictorial evidence, sequence events and produce captions for an exhibition. Another suggestion is the use of time-line programs to develop chronological understanding. In a more traditional vein, the use of wordprocessors and simple databases is encouraged at this stage.

Key Stage Two introduces desktop publishing, and again cites overlay keyboards, this time to look at visual evidence, such as maps. Databases can be used to investigate a census or parish return and the use of simulations to study evidence and the cause of an event is one of the more interesting options open to teachers.

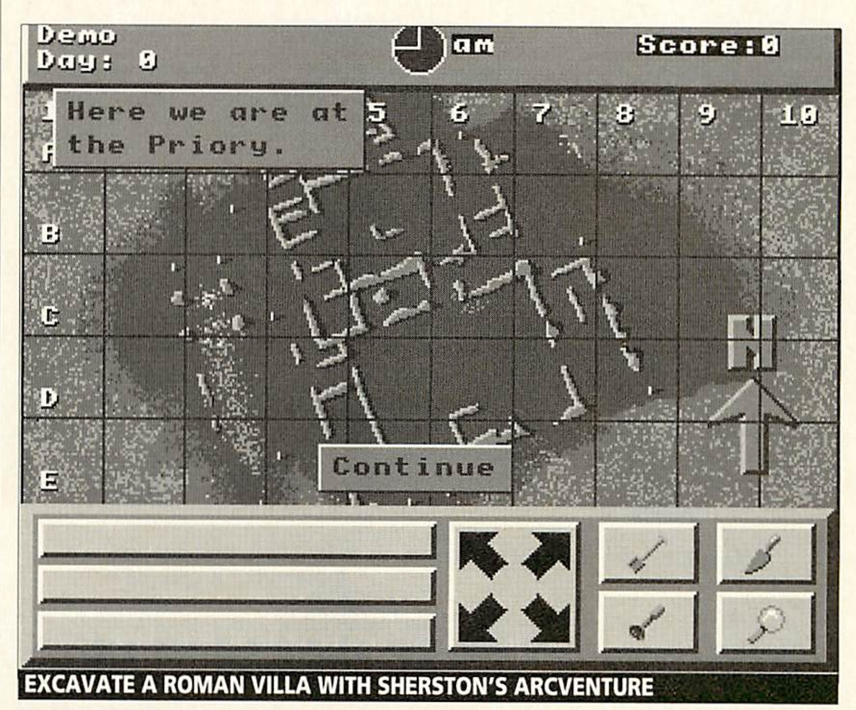
At Key Stage Three, wordprocessing is suggested as a way of producing displays and booklets. Databases can be used to analyse sources, test hypothesis, and relate enquiry results to other sources. Simulations at this stage can be used to explore reasons: for example, why a castle was located in a certain place.

By Key Stage Four wordprocessing and desktop publishing are used to explore viewpoints and propaganda, and databases can be used to handle and analyse data in a variety of sophisticated ways.

GENERAL SOFTWARE

These guidelines make one point very clear – software does not have to be directly related to history to be relevant to the curriculum. General software, such as wordprocessors, desktop publishers, hypermedia and text revelation programs, all have a role to play.

Multimedia resource packs are slowly becoming more popular. These are usually discs containing sprite or draw files that can be included in children's presentations. Anglia Television has got off to the best start with six discs of monochrome draw files covering Romans, Medieval Realms, Invaders, United Kingdom 1500-1750 and Britain 1750-1900. As draw files they are easily edited and coloured in *Draw* and can be scaled accurately in desktop publishing programs – and these are thoroughly recommended for Key Stages Two and Three. If you intend to do any work on heraldry, then the draw files of shields and devices from GA Herdman Educational offer an excellent starting point from which a 'designer shields' application could be developed, using draw objects. Similarly, a range of English kings and queens is available in the form of compact sprite files from Emerald Publishing.



EXCAVATE A ROMAN VILLA WITH SHERSTON'S ARCVENTURE

CHRIS DRAGE looks at how computers can support history study in the classroom

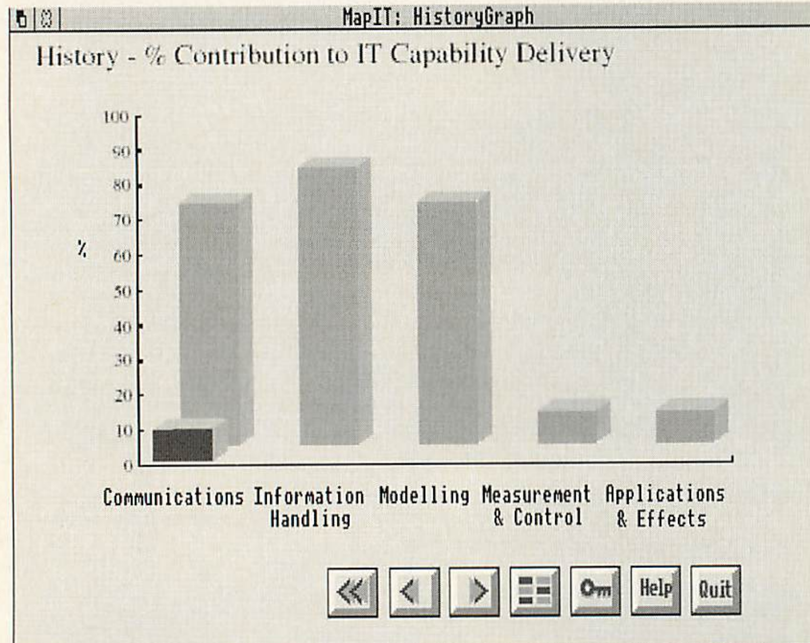
There is a number of inexpensive and original outline fonts which provide added interest to children's written work. For example, try *Acropolis* (Greek), *Celtic* and *Goffic* (an easy-to-read Gothic style).

Information handling is also a major aspect of computer use throughout the National Curriculum. Database Management Systems were discussed in *BAU* March issue. For a handy summary of which packages are appropriate at each stage, take a look at the summary table on page 84.

One recommendation in the non-statutory guidelines is the analysis of census material by a database. In fact, there are two applications designed for this purpose: *Key Census* and

INFORMATION HANDLING

Age range	BBC B/Master 128	Archimedes/A3000
Key Stage One	Folio, Prompt/Writer	Phases#2, Single Screen Folio
	Infant Tray	
	Our Facts	Datasweet
Key Stage Two	Folio, Pendown	Desktop Folio, Pendown
	Printbox, Developing Tray	Magpie
	Grass, Key	Junior Database, Datasweet
	Key 128	Keynote, DataKing
Key Stage Three	View, Pendown	Pendown, Impression Jnr
	Printbox, Pixel Perfect	Magpie, Genesis II
	Developing Tray	
	Grass, Key, Find	Key Plus, DataKing
	Key 128	
Key Stage Four	View, Pixel Perfect	Impression II, Pipedream
	Key, Key 128	Easywriter, Ovation, Genesis, Key Plus, Squirrel



MAPIT IS USED TO CHART THE RELATIONSHIP BETWEEN I.T. AND HISTORY

School Census Resource Pack 9. These were both discussed in detail in *BAU* June issue. A recent addition is *KeyPlus2*, with its comprehensive worldwide mapping system. This integrated mapping system means that datafiles with locational information can recognise *KeyPlus* maps and print them out – very useful for Key Stages Two to Four.

Timelines has been around for the BBC B for some years now, and is arguably the best program around for plotting historical events on a time map. With the help of a teacher, this program can be employed at Key Stage One, but it is ideally suited for older children.

The Master 128 version provides several enhancements over the original version, while the Archimedes version combines all the best features of the BBC and Master versions. It already has a Victorian database available, containing entries for most of the items mentioned in History Study Unit Four. *Timelines* data provides a valuable resource and can be extended by users as required.

The BBC Model B computer is worth having just to run *Castle Pack*, *Cateby Manor*, *Forge* and all ex-Resource programs. A great deal of information about life in the Middle Ages can be gleaned from the first two programs.

Castle Pack is a complete package of learning materials that is used to explore the activities of a typical 13th-century castle, through a database comprising personal details of 67 of the castles' occupants. *Cateby Manor* takes this approach even further and contains different types of datafiles from which children can learn about life in a manor in 1086. It aims to help pupils develop an understanding of information handling and questioning techniques, as well as to think creatively within an historical context.

Forge is a study of the Industrial Revolution through the eyes of an Earl who has fallen on hard times. The package covers issues relating to geography and topology, sociology, economics, chemistry, industrial relations and statistical analysis.

More recently, this approach has been adopted by ESM whose comprehensive *ISCA* pack aims to help pupils experience life in Roman Britain and certainly fulfils a good deal of history's AT One. In addition to databases, the package contains a story book, worksheets, maps and grids, as well as an on-screen adventure

CONTENT-BASED SOFTWARE

Of course, many packages were written solely to teach history, and content-based software has become widespread. Typically, this type of software uses simulation to arouse the children's interest. Placing pupils in an historical situation helps them to understand the past.

The degree to which simulation is used can be decided by the teacher: it can be an all-encompassing topic for which supporting resources must be gathered. Alternatively, it can become one of a number of activities, each having a common theme.

It is impossible in this feature to look at the entire range of available historical software, so bear in mind that the examples given opposite are just the tip of the iceberg.

Ginn was a pioneering company with its simulations, *Mary Rose* and *Saqqara*, resource packs which have become familiar to most teachers over the years. Tressell Publications improved on the concept considerably with *Into The Unknown*, *Wagons West* and *1665 – The Great Plague Of London*. The support material makes each pack an excellent classroom resource and they are currently being updated. This should bring them into line with the history orders and the addition this term of Exploration and Encounters.

Several companies produce very good BBC B and Master 128 software in support of historical themes. *Norman England* from Fernleaf Educational Software is a suite of four programs which gives children a glimpse into the social status, responsibilities and experiences of 12th-century folk. In *Fletcher's Castle* the children take the role of Sir Simon Fletcher, a Norman knight who must build his motte and bailey castle in 10 days.

Viking England, also from Fernleaf, provides a useful opportunity to integrate computer software with the BBC's *Vikings* (Zig Zag)

MESSAGE FROM GALACTIC COUNCIL...

The Universe has begun to contract and the threat this poses to our home galaxy has provoked an ambitious plan - a pathfinding mission to the outer regions of the universe in search of new galaxies for colonisation. In preparation for this mission, the Galactic Council has developed a simulator in which pilot cadets can begin to aquire the many and diverse skills required for the pathfinding mission. Towards this goal, you are invited to commit yourself to participate in ...

Karma - The Flight Trainer

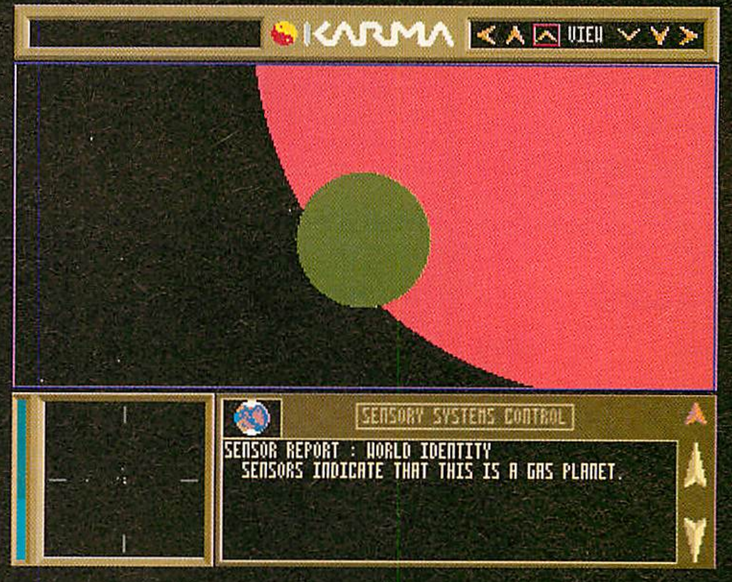
Trainees will be expected to become proficient in the skills of Flight, Navigation, Exploration and Sensing of the natural environment, and in order to graduate, will need to complete specific tasks, the nature of which remains top secret.



Manual Flight control

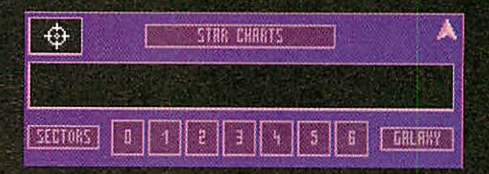


The Mothership's autopilot navigating to a planet.



The Mothership's sensors identify a body as a Gas Planet, orbiting a nearby Red Giant.

The Council has resolved that those cadets who commit to the training programme will be entitled to an allowance of the cost of the Trainer against the price of enrolment in the pathfinding mission. Cadets who successfully complete the training programme, and who wish to take part in the pathfinding mission, are expected to be able to commence their vast journey in the next year.



The Trainer allows access to one sector of the target galaxy. That sector comprises some 335 star systems, which should be sufficient for the purposes of the training mission.

Sector Zero starmap

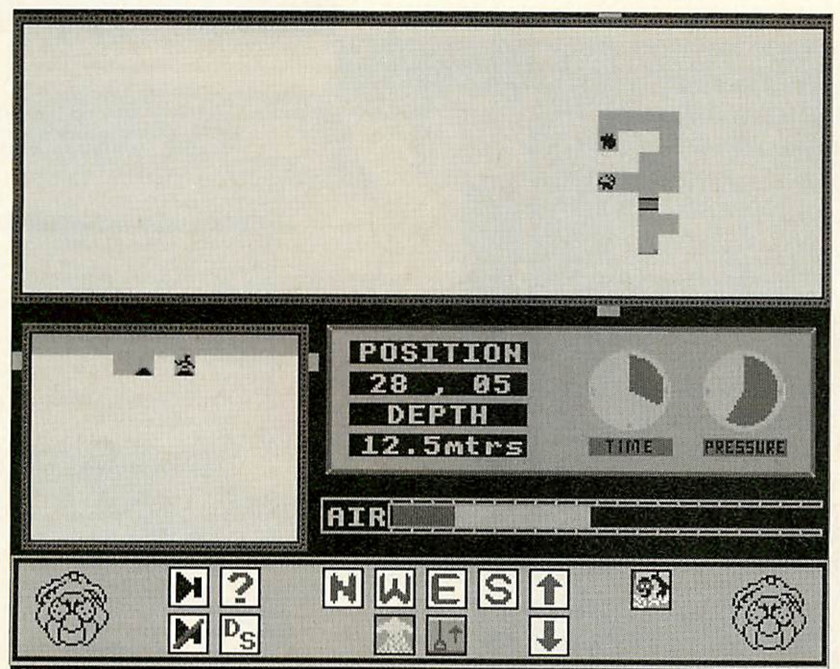
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STUDY MARITIME HISTORY WITH CSH'S MARY ROSE PACKAGE

material – see *BAU* September issue. One simulation on the subject of exploration, which could prove a valuable supplement to other resources, is ESM's *Settlement*. It offers children an active role in setting up an 18th-century colony – a good cross-curricular pack.

Longman Logotron publishes several historical software packages for the A3000/Archimedes which complement the BBC's very popular *Landmarks* television programme. The topics covered include Ancient Egypt, the Victorians and 1940. Digitised illustrations and on-screen conversations with a time-traveller allow history to come alive, as the children ask questions and move around in the historical worlds.

Simulated archaeology has always been a popular computer modelling theme, again pioneered by Ginn with *Mary Rose*. This particular topic has been taken much further by an exciting graphics-driven program and *Mary Rose – The anatomy of a Tudor warship*, a resource pack for the BBC, the Master and the Archimedes/A3000. It successfully creates an environment in which Tudor maritime history can be studied in an interesting and factual manner.

Recently, Sherston Software published *Arcventure* in which pupils dig at the site of an imaginary Roman villa. To investigate the objects found they must travel back in time, to explore the villa and converse with its occupants. This is a fascinating application of IT in history and one which could spawn a whole gamut of explorations, spanning all eras.

Touch Explorer Plus is a remarkably versatile program which can be used right across the age, curriculum and ability ranges and makes excellent use of the concept keyboard. At its simplest level it allows an image on a paper overlay to be explored in breadth, as well as vertically, in up to six layers of information.

Overlays can be pictures, maps, diagrams or text. Pressing an area of the overlay displays a message relevant to that area. Taking the example of *Castle Site* (one of the sample files) an overlay grid is presented, containing a very simple map depicting two rivers branching out from an estuary.

The children's task is to discover the best site to build a castle on. There are three levels: the first gives the height above sea level for each square on the map, the second provides information about the land and vegetation and the third gives more detailed information about the wildlife and the village on the site. By exploring the site at each level, a picture begins to emerge and a decision is made.

Finally, the computer in the classroom can provide a useful interpreting link with design and technology: the excellent *Designer Castles* and *Medieval Village* were discussed in *BAU* September issue.

'Longman Logotron publishes several historical software packages for the A3000/ Archimedes which complement the BBC's very popular Landmarks TV programme...'

HISTORICAL PACKAGES

- Mary Rose – the anatomy of a Tudor warship for the Archimedes/A3000 costs £35 and is available from Cambridgeshire Software House, 7 Free Church Passage, St. Ives, Huntingdon, Cambridgeshire PE17 4AY.
- Arcventure for the Archimedes/A3000 costs £29.95 and is available from Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire SN16 0LH.
- ISCA and Settlement for the BBC Model B and Master 128 cost £39.50 and £22.50 respectively and are available from ESM, Duke Street, Wisbech, Cambridgeshire PE13 2AE.
- Historical clip art for the Archimedes/A3000 costs £12 for each collection and is available from ITV Association, 6 Paul Street, London EC2A 4JH.
- DTP-images 4 costs £8.99 and is available from GA Herdman Educational, 43 St Johns Drive, Clarborough, Retford, Nottinghamshire DN22 9NN.
- Gallery Discs cost £13.95 and are available from Emerald Publishing, 46 Sherwood Close, Cambridge CB1 3HA.
- Timelines and Victorian Britain cost £50 for the BBC B, £55 for the Master 128 and £60 for the Archimedes/A3000 and are available from Soft Teach Educational, Sturgess Farmhouse, Longbridge Deverill, Warminster, Wiltshire BA12 9YB.
- Touch Explorer Plus for the BBC B and Master 128 costs £17.50 and is available from Microelectronics Education Support Unit, Unit 6, Sir William Lyons Road, Science Park, University of Warwick, Coventry CV4 7EZ.
- Norman England, Fletcher's Castle and Viking England for the BBC B, Master 128 and Compact cost £39.95, £19.95 and £39.95 respectively and are available from Fernleaf Educational Software, Fernleaf House, 31 Old Road West, Gravesend, Kent DA11 0LH .
- Egypt, Victorians and 1940 for the Archimedes/ A3000 cost £19 each and are available from Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS.
- Designer Castles, Medieval Village for the BBC B and Master 128 cost £19.95 each and £60 each for the Archimedes/A3000 and are all available from Data Designs, Business and Innovation Centre, Innovation Way, Barnsley S75 1JL.
- Acropolis, Goffic and Celtic plus other outline fonts cost £2.50 each and they are available from Design Concept, 30 South Oswald Road, Edinburgh EH9 2HG.

The smArt Suite

All 4Mation packages for the Archimedes carry a FREE SITE LICENCE.

smArt SmArt is a Linked Graphics System. When picture files are loaded into smArt, different parts of the picture can be changed by making selections from a menu. The graphics components are automatically scaled so that the parts always fit. Pictures may be saved as Draw files or transferred to DTP programs or any other applications which can handle Draw files.

The smArt package comes with over two dozen files on subjects ranging from shops to cars, and churches to British Isles maps. Available as separate products are discs of smArt files on specific themes such as Leisure, Heraldry, Faces, Fashion, Homes, Trees & Gardens, and Dinosaurs.

smArt £55 (NZ$ 198) smArt discs £16 (NZ$ 59)





For those wishing to create their own smArt files, smArtFiler is an application which compiles smArt files from your source Draw files. Full instructions are provided along with lots of examples. Individual components may be scaled, rotated, and placed in front of or behind other components. Menu entries may be specified.

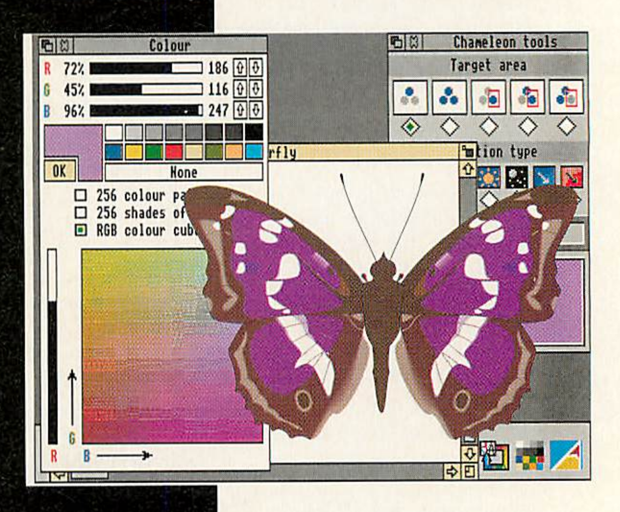
If it can be drawn it can be a smArt file.

smArtFiler £35 (NZ$ 129)



Chameleon is an ideal companion to smArt, and a must for anyone who needs to make quick and easy colour changes to Draw files. As well as palettes for 16 and 256 colour modes, there are options for 256 shades of grey and a RGB colour cube which provides thousands of colours. Colours may be selected from other Draw files so can be copied from one picture to another. Colours may also be changed in HSV values; Hue, Saturation and Value. Edited files may be saved as normal Draw files or as colour separations. A clever Undo and Redo facility allows virtually any number of colour changes to be cancelled and then reinstated. Zoom and Magnification facilities allow accurate editing of small areas.

Chameleon £25 (NZ$ 95)



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FILE O' FACTS

Trouble finding files? **STUART CUPIT**'s indexing program offers an easy solution

DiscIndex is an attempt to keep track of my sprawling, out-of-control disc collection by using a file-indexer. The result is a rather large program that is found on the monthly disc, but not in yellow pages. It allows you to index the contents individual discs and keep all of this information on one floppy disc.

The indexing system mimics the original disc filing system exactly. In other words, the files are displayed on the screen in the usual way, although, of course, you cannot access the contents. This makes it very easy to use and as many as 1000 files can be indexed and stored in approximately 32k.

The program installs itself on the icon bar and needs at least 160k of free memory. Clicking on the filing icon opens up a directory containing the index files, which will initially be empty.

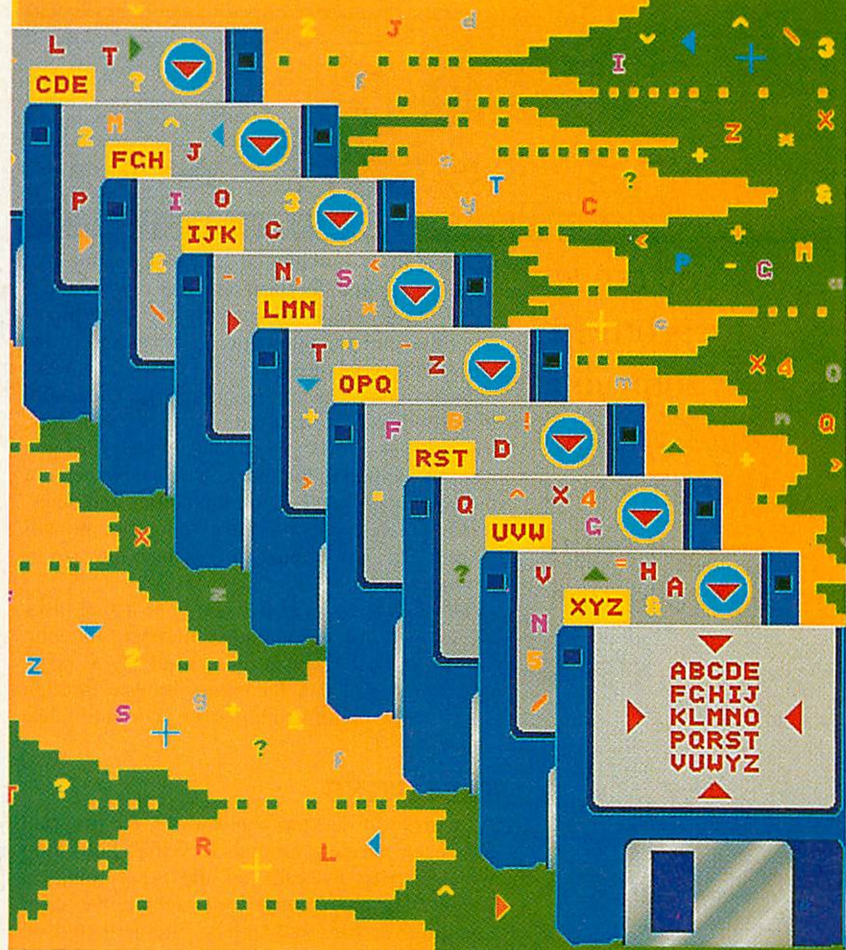


ILLUSTRATION BY PETER GUDYNAS

HOW TO INDEX

In order to index a disc, press the Menu button over the icon and go into the Index disc submenu. A window showing a selection of filing systems and drive numbers will appear, allowing you to select the disc which you want to index. The default disc is the floppy drive but this can be changed by setting the options in the window. A space is also provided for filing systems other than ADFS and SCSI.

To begin indexing, click on the Start icon. A percentage is used to show the state of progress. A save box is then opened, allowing you to save the newly-created index. Clicking on OK will save the index file into the index directory, under the same name as the disc itself.

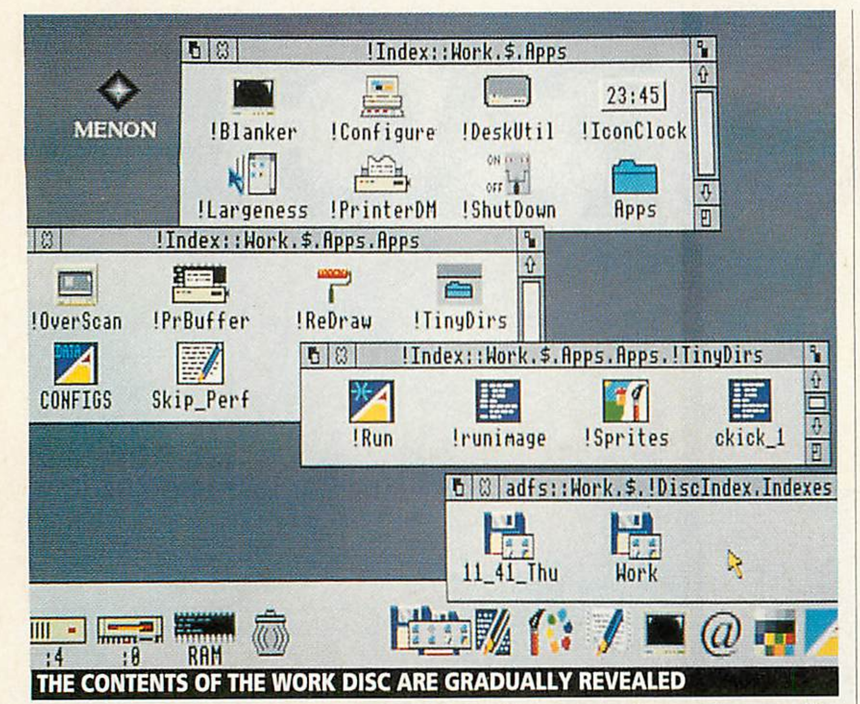
To view an index, either double-click on it or drag it over to the icon bar – this will load the index and display the root directory. The windows work in the same way as the normal filer. For example, clicking on a directory will open it, clicking on the close icon with Adjust closes that window and opens the former.

Pressing Menu over any window provides a few useful options, including an opportunity to change the file display from large to small icons. The Disc info option gives general information about the disc including its name, when it was indexed and any free space.

One of the most useful options is a quick Search option which can speed up the hunt for a particular file. Move into the Search submenu and enter the name of the file you are looking for. The program uses the normal wildcards when searching – # matches any character and * matches any sequence of characters. The file type can also be entered and you can search for files, directories or both. Clicking on Start begins the searching, displaying a percentage of the disc checked.

If a file is found, the directory containing it is opened and its full path name can be seen in the windows title. The Continue icon begins searching from the last match – clicking on this with Adjust closes the previous match window. The option to Close all is used to close all of the open windows.

As well as searching through an individual index, clicking Menu over the icon bar provides a search all option, allowing you to look through every index for a particular file. This menu also allows you to name discs. To do this, click on the menu, or set it so that it automatically names the disc whenever an index is made. An option



THE CONTENTS OF THE WORK DISC ARE GRADUALLY REVEALED

'You can let others browse through your files, without handing over your entire disc collection'

to insert the disc name is shown. If a name like Disc# is entered, the program will replace the # sign with a number. It can also be set to increment this number automatically, so that the files are in sequential order.

Some index files can be quite large, especially if hard discs are indexed. To cope with this, Record files allows you to select which files you want to include in the index. You can screen out the contents of application directories and determine which type of sprites the program will record. This can dramatically reduce the size of the index files.

DiscIndex works best when your actual discs are kept in order of name or number, allowing you to find the relevant disc as quickly as possible. Then you can let others browse through your files, without handing over your entire disc collection.

THE LISTING

As with most desktop applications, the program has been written around a Wimp_Poll loop which repeatedly calls all the other routines. Index files are created by scanning the disc, counting the files and sprites. This is then used to dynamically claim enough memory to hold the index, and form the relocatable module area, using OS_Module. The next step is to recursively read all the file information on the disc and merge all the sprite files into one file. Any unwanted files or sprites are screened out and a linked list of file data is compiled, each file pointing to the next file and directories pointing to their contents. This can then be saved as an index file.

Loading indexes involves receiving a message from the filer and loading the appropriate file. The file's size and type are checked so that memory can be allocated and the program can be sure it is a valid index file. The program adds the new index to a linked list of loaded files. It then compiles a hash table of sprite names, so that it can quickly check whether a sprite is present when it displays the file windows. The program then proceeds to call up a routine to open a file window, passing it a pointer to the root directory.

New windows are opened by navigating the linked list of file information, passing pointers to the routines to create the icons, attaching the appropriate sprites and finding the file name plus any other information which the user needs to have on display. This is opened and the window handle and pointers are stored in an array called windows() enabling the program to reference the window later.

As with the filer windows, *DiscIndex* tries to fit the files into the window as it is resized by the user. If a request to open or move a window request is received, the size of the window is read and the icon positions adjusted. This works for all three display modes: large, small and full info icons.

The search routine works by using recursion to scan the linked lists – each time the routine finds a directory it calls itself with a pointer to the contents. This routine calls a string matching procedure, and if a match is found the appropriate window is displayed. The searching multitasks, allowing you to stop it at any point and continue looking for another match. This is managed by calling the polling procedure after every second of unsuccessful searching, returning if a null event is received on the next Wimp_Poll. Recursive routines are notoriously difficult to jump into and out of, but by using flags, the program is able to respond to the user clicking the Search icon by dropping back up the procedure stack while already in the process of searching.

The icon sprites recorded from the original disc are merged with a set of standard Rom sprites when a new index file is loaded. This sprite file is called *RomSprites* in the *DiscIndex* directory. It contains the icons for the most common file types and directories. This sprite file can be used to include any common icons in your index files, by loading it into *Paint* and merging your own icons into it then saving it back again.

The program uses a hashing technique to look up a sprite name. Some index files contain hundreds of sprites and to scan all of these looking for each icon would make opening a file window very slow. When a new index is loaded, a table of sprite names is compiled, with each name stored at a position in the table calculated from the characters in the name.

The procedure to make a hash table adds up the Ascii values of each character in the sprite name. It then modulates this with the hash table size. The name is then stored at this offset into the table. If two sprite names produce the same hash value then the routine simply places the name at the next free space. Another look-up routine can then see if a sprite exists in one quick step.

The program constantly tries to free memory. Once an index file has been loaded, each Close window request checks to see if it can free any memory. So the program only uses as much memory as it needs to hold the source code and the indexes being looked at. This means it can be used on a machine without requiring huge amounts of free space.

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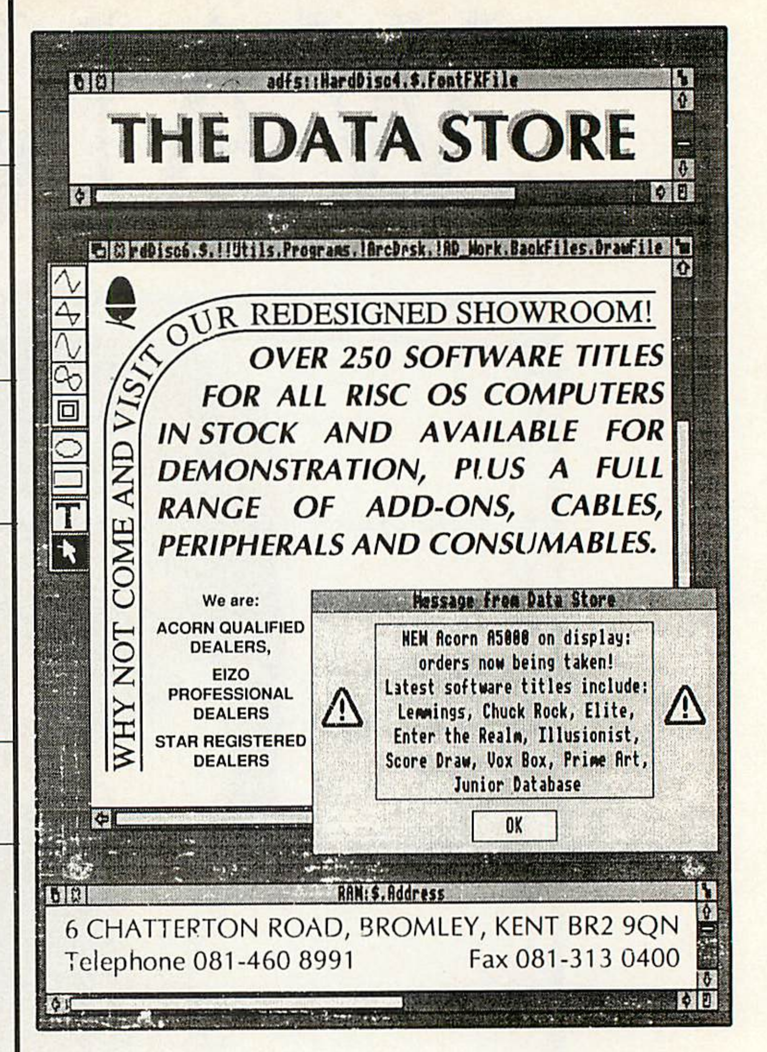
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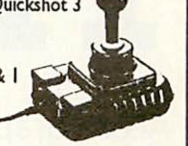
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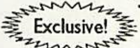


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GET IN THE PICTURE

Acorn graphics are on the move, so keep up to date with our new column

Most of you will have a graphics package of some description. And if you have, you will doubtless have spent at least a couple of hours, if not many more, doodling on the screen.

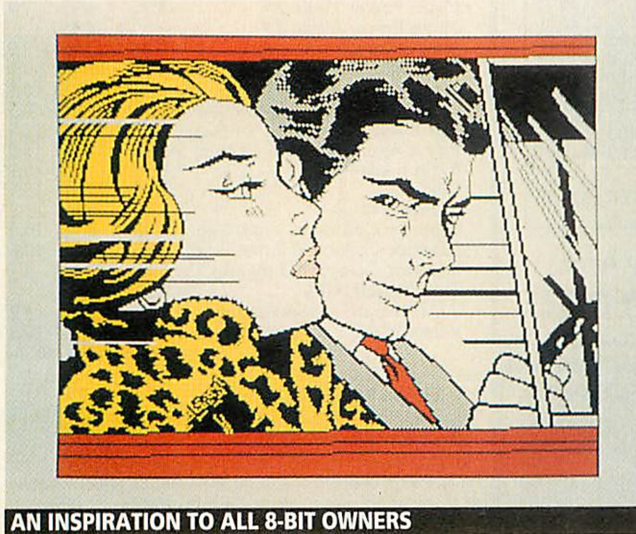
Recent graphics competitions have shown that, when it comes to using the computer screen as a canvas, there is a wealth of talent out there. But, sadly, many of your efforts simply get stored on discs and are never seen again.

This is why we plan to introduce a graphics column. It will be your chance to exchange hints and tips on using certain graphics applications and to show off some of the results.

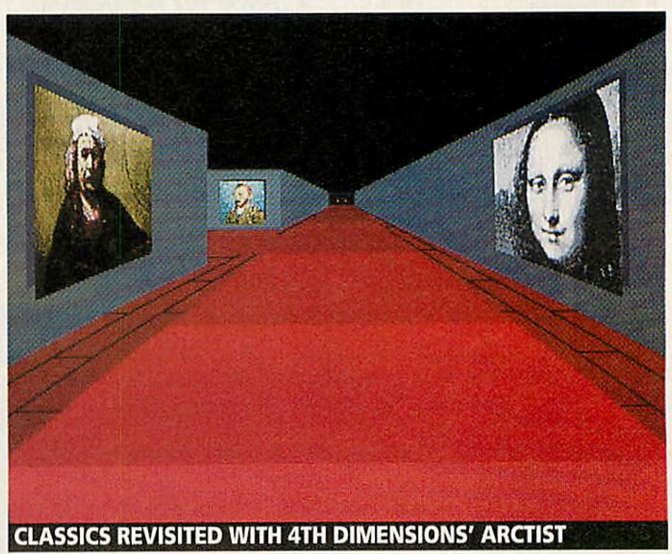
The bi-monthly column will also include a picture of the month, drawn by one of you. This will win a cash prize, or maybe a piece of software. So send in your screens, or if you haven't got any then draw some. There will also be news and views on the ever-growing world of computer graphics.



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A WINNING ENTRY FROM A PREVIOUS BAU GRAPHICS COMPETITION

what to expect in the way of software or hardware releases and news on any graphics upgrades available. Neither will the column be restricted to motionless graphics. The best simple animations that we receive will be put on the monthly disc, so that your hard work can be admired by a wider audience.

And what do we want from you? Well for a start you can begin by sending in your artwork, animations, demos plus any suggestions for what you would like to see in your regular graphics column. So put pen to paper, fingers to keys or mouse to mouse mat and send those ideas and pictures in to, Graphics Column, *BBC Acorn User*, 20-26 Brunswick Place, London, N1 6DJ.

And while we are on the subject of graphics, some of you may remember a small graphics competition held in Pieces of Eight recently. Well we've sorted through the entries and picked a winner – take a look at the results below. The winner will receive a game from the extensive Superior Software collection.



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THE PIECES OF EIGHT WINNER IS CHRIS THORNELL



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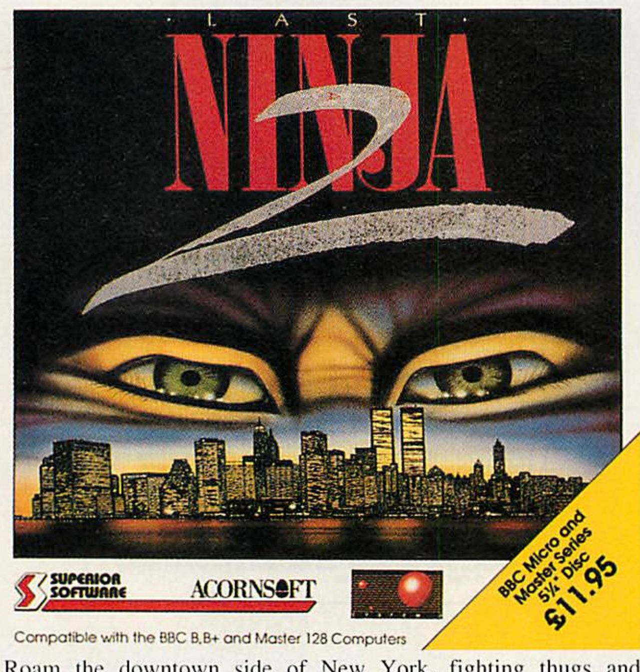
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They cover a range of applications as you can see. All you have to do is choose the item of software you require, complete the coupon on the facing page and send it back to us with your payment.

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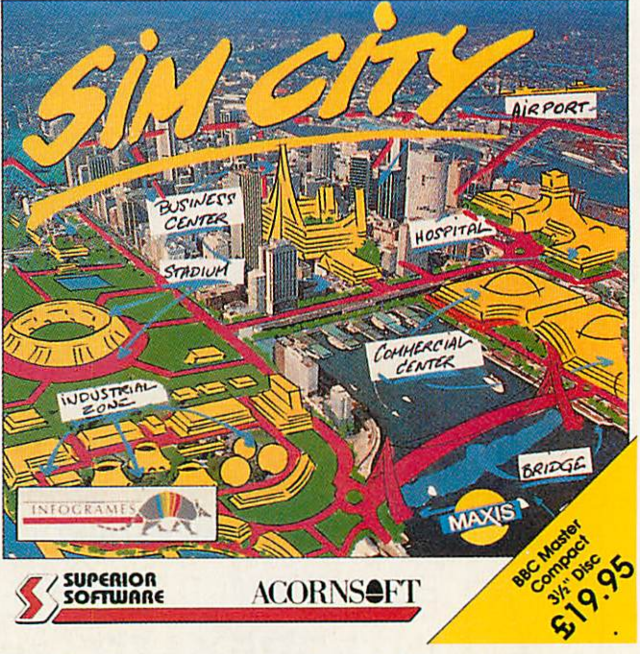
Roam the downtown side of New York, fighting thugs and bandits. Will you get to the Kunitoki Castle to face your enemy?



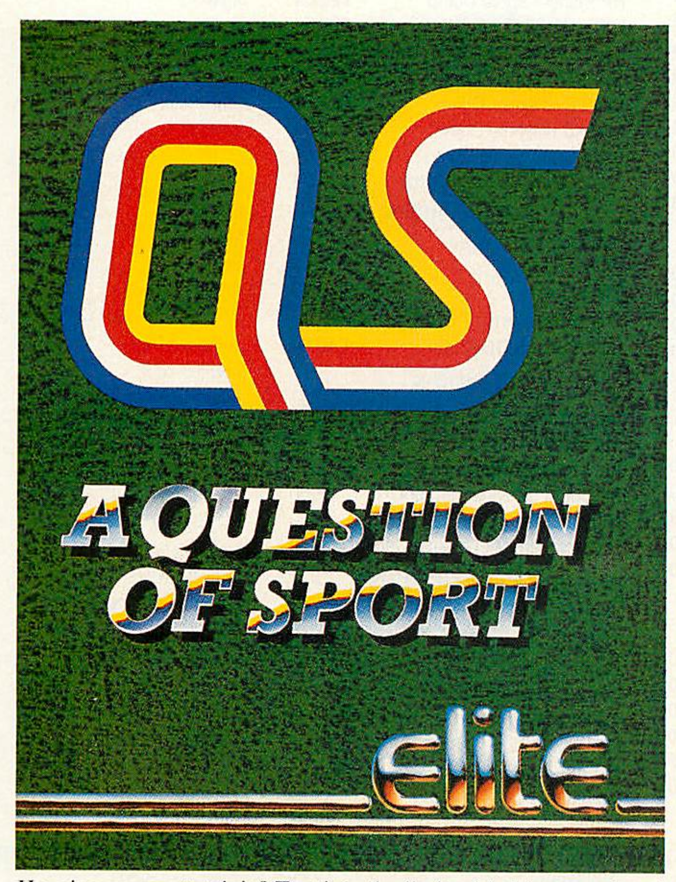
Speech, the highly acclaimed speech synthesizer for the BBC, needs no hardware to make your micro talk, but uses simple commands to invoke words. If you haven't got this program, now's your chance!



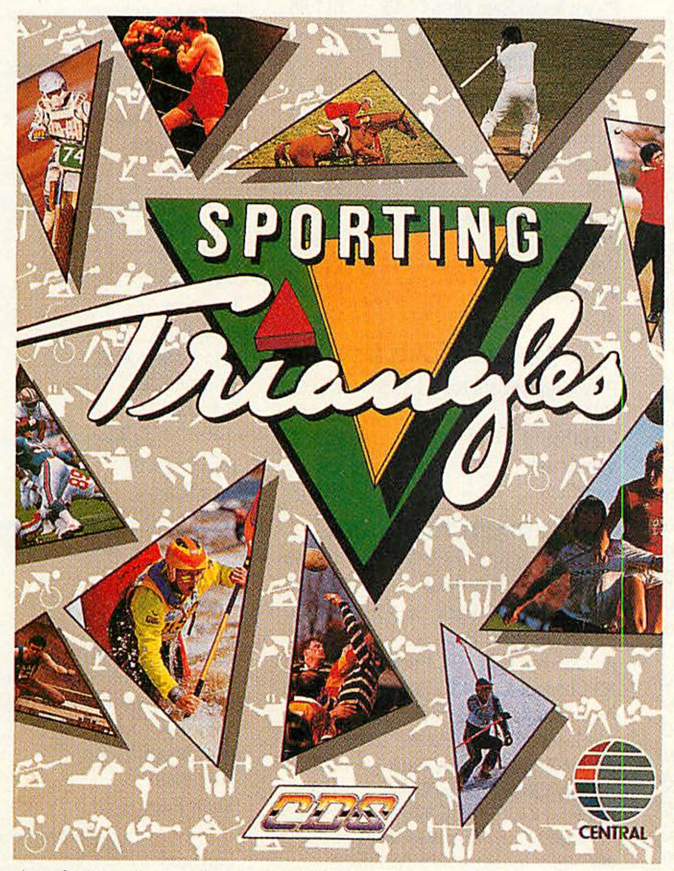
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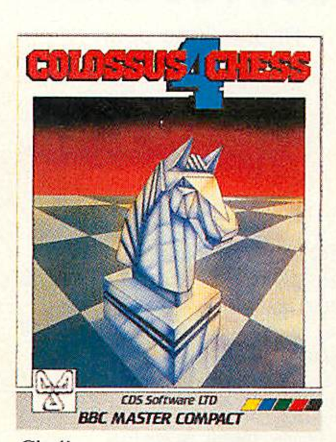
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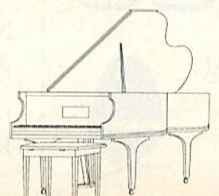
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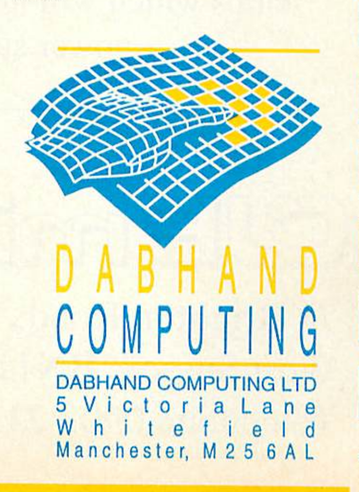


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★Info

Listing 1

```
   10 REM >MakeHexes (Info1)
   20 REM by Dave Lawrence
   30 REM for Arc only
   40 REM (c) BAU Dec91
   50 :
   60 ssize=20480
   70 PROCinitarea
   80 PROChex("T0888",9,"18")
   90 PROChex("T0777",9,"10")
  100 FOR col=1 TO 6
  110 PROChex("T0ccc",9,STR$(20+col))
  120 PROChex("T0CCC",9,STR$(10+col))
  130 PROChex("TTT0c",9,STR$(col))
  140 NEXT
  150 PROChex("00013",1,"counter")
  160 PROChex("01230",1,"pointer")
  170 SYS "OS_SpriteOp",256+12,sprites,"
Hexes"
  180 END
  190 :
  200 DEF PROChex(col$,mode,name$)
  210 SYS "OS_SpriteOp",256+15,sprites,n
ame$,,16,16,mode
  220 IF INSTR(col$,"T") SYS "OS_SpriteO
p",256+29,sprites,name$
  230 RESTORE
  240 IF name$="pointer" FOR i=1 TO 16:R
EAD a$:NEXT
  250 FOR y=15 TO 0 STEP -1
  260 READ a$
  270 FOR x=0 TO 15
  280 PROCplot(x,y,MID$(col$,1+VALMID$(a
$,x+1,1),1))
  290 NEXT
  300 NEXT
  310 ENDPROC
  320 :
  330 DEF PROCplot(x,y,c$)
  340 CASE c$ OF
  350 WHEN "T" : PROCplotmask(x,y)
  360 WHEN "C" : PROCplotsprite(x,y,col)
  370 WHEN "c" : PROCplotsprite(x,y,col+
8)
  380 OTHERWISE: PROCplotsprite(x,y,VALc
$)
  390 ENDCASE
  400 ENDPROC
  410 :
  420 DEF PROCplotsprite(x,y,c)
  430 SYS "OS_SpriteOp",256+42,sprites,n
ame$,x,y,c
  440 ENDPROC
  450 :
  460 DEF PROCplotmask(x,y)
  470 SYS "OS_SpriteOp",256+44,sprites,n
ame$,x,y,0
  480 ENDPROC
  490 :
  500 DEF PROCinitarea
  510 DIM sprites ssize
  520 !sprites=ssize:sprites!8=16
  530 SYS "OS_SpriteOp",256+9,sprites
  540 ENDPROC
  550 :
  560 DATA 0000000110000000
  570 DATA 0000011221100000
  580 DATA 0001122222211000
  590 DATA 0112222332222110
  600 DATA 1222233443322221
  610 DATA 1222344444432221
  620 DATA 1222344444432221
  630 DATA 1223444444443221
  640 DATA 1223444444443221
  650 DATA 1222344444432221
  660 DATA 1222344444432221
  670 DATA 1222233443322221
  680 DATA 0112222332222110
  690 DATA 0001122222211000
  700 DATA 0000011221100000
  710 DATA 0000000110000000
  720 :
  730 DATA 1100000000000000
  740 DATA 1311000000000000
  750 DATA 0133110000000000
  760 DATA 0132331100000000
  770 DATA 0013223311000000
  780 DATA 0013222233110000
  790 DATA 0001322222331100
  800 DATA 0001322222223100
  810 DATA 0000132222231000
  820 DATA 0000132222231000
  830 DATA 0000013222223100
  840 DATA 0000013233222310
  850 DATA 0000001311322231
  860 DATA 0000001100132310
  870 DATA 0000000000013100
  880 DATA 0000000000001000
```

Listing 2

```
   10 REM >Checkers (Info2)
   20 REM by Dave Lawrence
   30 REM For Arc only
   40 REM (c) BAU Dec `91
   50 :
   60 MODE 9:OFF
   70 PROCinit
   80 PROCmakeboard
   90 REPEAT
  100 players()=0:PROCdrawboard
  110 players=FNgetplayers:PROCinitpiece
s
  120 winner=FNgame:PROCwin(winner)
  130 UNTIL FALSE
  140 END
  150 :
  160 DEF PROCinit
  170 ORIGIN 96,0
  180 colours=6:pieces=10
  190 ssize=&2000:frac=0.85
  200 DIM grid(20,20),startx(colours,pie
ces),starty(colours,pieces)
  210 DIM home(20,20),empty(20,20),game(
20,20)
  220 DIM x(colours,pieces),y(colours,pi
eces)
  230 DIM sx(20,20),sy(20,20)
  240 DIM players(colours),cols(colours,
2),inplace(colours)
  250 DIM dx(5,1),dy(5,1)
  260 DIM sprites ssize
  270 !sprites=ssize
  280 sprites!8=16
  290 SYS "OS_SpriteOp",256+9,sprites
  300 SYS "OS_SpriteOp",256+10,sprites,"
Hexes"
  310 SYS "OS_SpriteOp",256+36,sprites,"
pointer",%1100001,0,0
  320 SYS "OS_SpriteOp",256+36,sprites,"
counter",%1100010,8,8
  330 READ r0,g0,b0
  340 COLOUR 15,r0,g0,b0
  350 VDU 19,0,24,r0,g0,b0
  360 VDU 19,8,17;0;
  370 VDU 19,8,18;0;
  380 MOUSE COLOUR 1,0,0,0
  390 FOR col=1 TO colours
  400 READ r,g,b
  410 COLOUR col,r,g,b
  420 COLOUR col+8,r*frac,g*frac,b*frac
  430 cols(col,0)=r
  440 cols(col,1)=g
  450 cols(col,2)=b
  460 NEXT
  470 FOR dir=0 TO 5
  480 FOR mod=0 TO 1
  490 READ dx(dir,mod),dy(dir,mod)
  500 NEXT:NEXT
  510 COLOUR 128+15
  520 CLS
  530 ENDPROC
  540 :
  550 DEF PROCmakeboard
  560 grid()=-1:empty()=-1
  570 FOR y=0 TO 20
  580 READ a$
  590 IF (y MOD 2)=0 a$=" "+a$ ELSE a$=a
$+" "
  600 x=0
  610 REPEAT
  620 h$=LEFT$(a$,1)
  630 IF h$<>" " THEN
  640 grid(x,y)=(ASCh$ AND &DF)-64
  650 empty(x,y)=0
  660 sx(x,y)=x*4*16+(y MOD 2)*4*8
  670 sy(x,y)=1024-4*16-y*4*12
  680 IF h$>="A" AND h$<="F" THEN
  690 c=grid(x,y)
  700 startx(c,0)+=1
  710 n=startx(c,0)
  720 startx(c,n)=x
  730 starty(c,n)=y
  740 home(x,y)=c
  750 ENDIF
  760 ENDIF
  770 x=x+1
  780 a$=MID$(a$,3)
  790 UNTIL LENa$<2
  800 NEXT
  810 ENDPROC
  820 :
  830 DEF PROCdrawboard
  840 FOR y=0 TO 20:FOR x=0 TO 20
  850 c=grid(x,y)
  860 IF c<>-1 THEN
  870 PROCsquare(x,y,c)
  880 ENDIF
  890 NEXT:NEXT
  900 ENDPROC
  910 :
  920 DEF PROCinitpieces
  930 game()=empty()
  940 inplace()=0
  950 FOR col=1 TO colours
  960 opp=FNopp(col)
  970 FOR piece=1 TO pieces
  980 x=startx(opp,piece)
  990 y=starty(opp,piece)
 1000 IF players(col)<>0 THEN
 1010 x(col,piece)=x
 1020 y(col,piece)=y
 1030 PROCpiece(x,y,col)
 1040 game(x,y)=col
 1050 ELSE
 1060 PROCsquare(x,y,opp)
 1070 ENDIF
 1080 NEXT
 1090 ENDIF
 1100 NEXT
 1110 ENDPROC
 1120 :
 1130 DEF PROCredraw(rx,ry)
 1140 PROCsquare(rx,ry,grid(rx,ry))
 1150 ENDPROC
 1160 :
 1170 DEF PROCsquare(px,py,pc)
 1180 IF grid(px,py)<>-1 THEN
 1190 SYS"OS_SpriteOp",256+34,sprites,ST
R$(10+pc),sx(px,py),sy(px,py),8
 1200 ENDIF
 1210 ENDPROC
 1220 :
 1230 DEF PROCpiece(px,py,pc)
 1240 SYS"OS_SpriteOp",256+34,sprites,ST
R$(pc),sx(px,py),sy(px,py),8
 1250 ENDPROC
 1260 :
 1270 DEF FNopp(a)
 1280 =(a+2)MOD6+1
 1290 :
 1300 DEF FNgetplayers
 1310 MOUSE COLOUR 2,r0,g0,b0
 1320 MOUSE COLOUR 3,r0/2,g0/2,b0/2
 1330 MOUSE ON 1
 1340 players=0
 1350 REPEAT:REPEAT
 1360 click=FNgetsquare(x,y)
 1370 IF click AND 4 col=grid(x,y)
 1380 UNTIL col<>0 OR (click AND 2)
 1390 IF click AND 4 THEN
 1400 players(col)=1-players(col)
 1410 FOR i=1 TO pieces
 1420 IF players(col)=1 THEN
 1430 PROCpiece(startx(col,i),starty(col
,i),col)
 1440 players+=1
 1450 ELSE
 1460 PROCsquare(startx(col,i),starty(co
l,i),col)
 1470 ENDIF
 1480 NEXT
 1490 PROCrelease
 1500 ENDIF
 1510 UNTIL (click AND 2) AND players<>0
 1520 =players
 1530 :
 1540 DEF FNgetsquare(RETURN mx,RETURN m
y)
 1550 got=FALSE
 1560 REPEAT:REPEAT
 1570 MOUSE mx,my,mz
 1580 UNTIL mz<>0
 1590 IF mz AND 4 THEN
 1600 IF POINT(mx,my)<>15 THEN
 1610 PROCconvsquare(mx,my)
 1620 IF mx>-1 AND mx<21 AND my>-1 AND m
y<21 got=TRUE
 1630 ENDIF
 1640 ENDIF
 1650 IF mz AND 2 THEN
 1660 got=TRUE
 1670 ENDIF
 1680 UNTIL got
 1690 =mz
 1700 :
 1710 DEF PROCrelease
 1720 REPEAT
 1730 MOUSE xxx,yyy,zzz
 1740 UNTIL zzz=0
 1750 ENDPROC
 1760 :
 1770 DEF PROCconvsquare(RETURN csx,RETU
RN csy)
 1780 sqx=csx DIV 32
 1790 sqy=csy DIV 16
 1800 CASE sqy MOD 6 OF
 1810 WHEN 0   :
 1820 IF sqx MOD 2=0 above=FNbackslope E
LSE above=FNslope
 1830 IF above PROCtype12:csy-=1 ELSE PR
OCtype45
 1840 WHEN 1,2 : PROCtype12
 1850 WHEN 3   :
 1860 IF sqx MOD 2=1 above=FNbackslope E
LSE above=FNslope
 1870 IF above PROCtype45:csy-=1 ELSE PR
OCtype12
 1880 WHEN 4,5 : PROCtype45
 1890 ENDCASE
 1900 ENDPROC
 1910 :
 1920 DEF PROCtype12
 1930 csx=sqx DIV 2:csy=20-((sqy-1) DIV
3)
 1940 ENDPROC
 1950 :
 1960 DEF PROCtype45
 1970 csx=(sqx-1) DIV 2
 1980 csy=19-((sqy-4) DIV 3)
 1990 ENDPROC
```

```
2000 :
2010 DEF FNslope
2020 =(2*(csy-16*sqy)>csx-32*sqx)
2030 :
2040 DEF FNbackslope
2050 =(2*(csy-16*sqy)>32*(sqx+1)-csx)
2060 :
2070 DEF FNgame
2080 player=0
2090 REPEAT
2100 REPEAT
2110 player+=1
2120 IF player>6 player-=6
2130 UNTIL players(player)<>0
2140 REPEAT
2150 moved=FALSE:help=FALSE
2160 PROCsetcols(cols(player,0),cols(player,1),cols(player,2))
2170 REPEAT
2180 click=FNgetsquare(x,y)
2190 IF click=4 col=game(x,y)
2200 UNTIL col=player
2210 moves=FNfindmoves(x,y,col)
2220 IF moves>0 THEN
2230 MOUSE ON 2
2240 PROCsquare(x,y,10+col)
2250 PROCrelease
2260 game(x,y)=-3
2270 REPEAT
2280 click=FNgetsquare(x2,y2):done=FALSE
2290 IF click=4 THEN
2300 IF game(x2,y2)<-1 THEN
2310 IF help PROChelp(FALSE)
2320 FOR cmx=0 TO 20
2330 FOR cmy=0 TO 20
2340 IF game(cmx,cmy)<-1 THEN
2350 game(cmx,cmy)=0
2360 ENDIF
2370 NEXT
2380 NEXT
2390 PROCredraw(x,y)
2400 IF x=x2 AND y=y2 THEN
2410 game(x,y)=player
2420 ELSE
2430 moved=TRUE
2440 game(x2,y2)=player
2450 game(x,y)=0
2460 inplace(player)+=((home(x,y)=player)-(home(x2,y2)=player))
2470 ENDIF
2480 PROCpiece(x2,y2,player)
2490 done=TRUE
2500 ENDIF
2510 ENDIF
2520 IF click=2 AND NOT help THEN
2530 PROChelp(TRUE)
2540 help=TRUE
2550 ENDIF
2560 UNTIL done
2570 MOUSE ON 1
2580 PROCrelease
2590 ENDIF
2600 UNTIL moved
2610 UNTIL inplace(player)=10
2620 =player
2630 :
2640 DEF PROChelp(help)
2650 FOR helpx=0 TO 20
2660 FOR helpy=0 TO 20
2670 IF game(helpx,helpy)=-2 THEN
2680 IF help PROCsquare(helpx,helpy,8) ELSE PROCredraw(helpx,helpy)
2690 ENDIF
2700 NEXT:NEXT
2710 ENDPROC
2720 :
2730 DEF PROCsetcols(r,g,b)
2740 MOUSE COLOUR 2,r,g,b
2750 MOUSE COLOUR 3,r*frac,g*frac,b*frac
2760 VDU 19,8,18,r,g,b
2770 ENDPROC
2780 :
2790 DEF FNfindmoves(sx,sy,c)
2800 moves=0
2810 o=FNopp(c)
2820 FOR dir=0 TO 5
2830 IFFNmaybe(sx+dx(dir,sy MOD 2),sy+dy(dir,sy MOD 2))
2840 NEXT
2850 PROCjumps(sx,sy)
2860 =moves
2870 :
2880 DEF PROCjumps(jx,jy)
2890 LOCAL dir
2900 FOR dir=0 TO 5
2910 ox=jx+dx(dir,jy MOD 2)
2920 oy=jy+dy(dir,jy MOD 2)
2930 IF ox>=0 AND ox<=20 AND oy>=0 AND oy<=20 THEN
2940 IF game(ox,oy)>0 THEN
2950 tx=ox+dx(dir,oy MOD 2)
2960 ty=oy+dy(dir,oy MOD 2)
2970 IF FNmaybe(tx,ty) THEN
2980 PROCjumps(tx,ty)
2990 ENDIF
3000 ENDIF
3010 ENDIF
3020 NEXT
3030 ENDPROC
3040 :
3050 DEF FNmaybe(mx,my)
3060 IF mx<0 OR mx>20 OR my<0 OR my>20 THEN =FALSE
3070 IF game(mx,my)<>0 THEN =FALSE
3080 IF grid(mx,my)<>0 AND grid(mx,my)<>c AND grid(mx,my)<>o THEN =FALSE
3090 moves+=1
3100 IF FALSE THEN PROCsquare(mx,my,8)
3110 game(mx,my)=-2
3120 =TRUE
3130 :
3140 DEF PROCwin(player)
3150 dest=player
3160 steps=32
3170 r=r0:g=g0:b=b0
3180 REPEAT
3190 r1=(cols(dest,0)-r)/steps
3200 g1=(cols(dest,1)-g)/steps
3210 b1=(cols(dest,2)-b)/steps
3220 pos=0
3230 REPEAT
3240 WAIT
3250 VDU 19,0,24,r,g,b
3260 r+=r1:g+=g1:b+=b1:pos+=1
3270 MOUSE xxx,yyy,zzz
3280 UNTIL pos=steps OR zzz<>0
3290 dest=player-dest
3300 UNTIL zzz<>0
3310 VDU 19,0,24,r0,g0,b0
3320 PROCrelease
3330 ENDPROC
3340 :
3350 DATA 127,127,127
3360 DATA 240,  0,  0
3370 DATA 255,128,  0
3380 DATA 240,240,  0
3390 DATA   0,240,  0
3400 DATA   0,160,240
3410 DATA 128,  0,255
3420 :
3430 DATA +1, 0,+1, 0
3440 DATA  0,+1,+1,+1
3450 DATA -1,+1, 0,+1
3460 DATA -1, 0,-1, 0
3470 DATA -1,-1, 0,-1
3480 DATA  0,-1,+1,-1
3490 :
3500 DATA "            A            "
3510 DATA "           A A           "
3520 DATA "          A A A          "
3530 DATA "         A A A A         "
3540 DATA "        a a a a a        "
3550 DATA "F F F F f @ @ @ @ @ b B B B B"
3560 DATA " F F F f @ @ @ @ @ @ b B B B "
3570 DATA "  F F f @ @ @ @ @ @ @ b B B  "
3580 DATA "   F f @ @ @ @ @ @ @ @ b B   "
3590 DATA "    f @ @ @ @ @ @ @ @ @ b    "
3600 DATA "     @ @ @ @ @ @ @ @ @ @     "
3610 DATA "    e @ @ @ @ @ @ @ @ @ c    "
3620 DATA "   E e @ @ @ @ @ @ @ @ c C   "
3630 DATA "  E E e @ @ @ @ @ @ @ c C C  "
3640 DATA " E E E e @ @ @ @ @ @ c C C C "
3650 DATA "E E E E e @ @ @ @ @ c C C C C"
3660 DATA "        d d d d d        "
3670 DATA "         D D D D         "
3680 DATA "          D D D          "
3690 DATA "           D D           "
3700 DATA "            D            "
```

Listing 3

```
 10 REM >String (Info3)
 20 REM by Jan Vlietinck
 30 REM for Archimedes/A3000
 40 REM (c) BAU Dec '91
 50 :
 60 DIM Q% 40000
 70 MODE 13
 80 a=0:b=2:t=3:v=4
 90 c=5:w=6:j=7:col=8
100 scr=9:y=11:i=12
110 link=14:pc=15
120 FOR pass=0 TO 2 STEP 2
130 P%=Q%
140 [OPT pass
150 .set
160         ADR     R0,vdu
170         ADR     R1,vdu
180         SWI     "OS_ReadVduVariables"
190         MOV     pc,link
200
210 .wave
220         SWI     "OS_Mouse"
230         CMP     b,#0
240         MOVNE   pc,link
250         MOV     a,a,LSL #20
260         ADR     w,xtab
270         STR     a,[w]
280         LDR     t,kl
290         ADD     t,t,#1
300         STR     t,kl
310         MOV     col,t,LSR #4
320         LDR     scr,vdu
330         MOV     i,#0
340         ADR     w,xtab
350         LDR     a,[w]
360         LDR     b,[w,#8]
370         ADD     w,w,#8
380 .loop
390         ADD     t,w,#4
400         LDMIA   t,{v,c}
410         ADD     t,a,c
420         SUB     t,t,b,LSL #1
430         ADD     v,v,t,ASR #2
440         SUB     t,b,b,ASR #10
450         ADD     t,t,v
460         STMIA   (w)!,{t,v}
470         MOV     a,b
480         MOV     b,c
490         MOV     y,t,ASR #22
500         ADD     y,y,#128
510         CMP     y,#256
520         ADDLO   j,y,y,LSL #2
530         ADDLO   j,i,j,LSL #6
540         STRLOB  col,[scr,j]
550         ADD     i,i,#1
560         CMP     i,#320
570         BNE     loop
580         STR     t,[w]
590         SWI     "OS_ReadEscapeState"
600         BCC     wave
610         MOV     pc,link
620
630 .vdu    EQUD    148
640         EQUD    -1
650 .kl     EQUD    0
660 .xtab
670 ]
680 NEXT
690 FOR i%=0 TO 322*8-1
700 i%!P%=0
710 NEXT
720 CALL set
730 ORIGIN 640,512
740 OFF
750 CLS
760 CALL wave
770 END
```

Listing 4

```
 10 REM >CombDemo (Info4)
 20 REM By Colin Attenborough
 30 REM For BBC B/B+/M/C/E/A
 40 REM (c) BAU Dec '91
 50 :
 60 REM Needs to be incorporated into July's SortDemo
 61 :
 70 DEF FNcomb(from,to)
 80 gap%=to-from
 90 REPEAT
100 IF gap%>1 gap%=gap%*10/13 ELSE gap%=1
110 IF gap%=9 OR gap%=10 gap%=11
120 sorted=TRUE
130 FOR comb=from TO to-gap%
140 Moves=Moves+2
150 Comps=Comps+1
160 IF array(comb+gap%)<array(comb) PROCswap(comb,comb+gap%):sorted=FALSE
170 NEXT
180 UNTIL sorted AND gap%=1
190 =0
```

Listing 5

```
  10 REM >HexOne8 (Info5)
  20 REM By Paul Corke
  30 REM for BBC B/B+/M/C/E/!65Host
  40 REM (C) BAU Dec '91
  50 :
  60 IF PAGE>&E00 THEN PROCrelocate
  70 :
  80 osrdch=&FFE0
  90 oswrch=&FFEE
 100 osword=&FFF1
 110 PROCassemble
 120 CALL run
 130 END
 140 :
 150 DEF PROCassemble
 160 FOR pass=0 TO 2 STEP 2:P%=&2800
 170 [OPT pass
 180 .run
 190 LDA #22
 200 JSR oswrch
 210 LDA #1
 220 JSR oswrch
 230 LDA #23
 240 JSR oswrch
 250 LDA #1
 260 JSR oswrch
 270 LDA #0
 280 LDX #8
 290 .zeros
 300 JSR oswrch
 310 DEX
 320 BNE zeros
 330 LDX #1
 340 LDY #3
 350 JSR palette
 360 LDX #2
 370 LDY #5
 380 JSR palette
 390 LDX #3
 400 LDY #6
 410 JSR palette
 420 LDX #sx MOD 256
 430 LDY #sx DIV 256
 440 JSR vdu29
 450 JSR design
 460 .repeat
 470 CLC
 480 LDA size
 490 ADC #8
 500 STA size
 510 LDA size+1
 520 ADC #0
 530 STA size+1
 540 CLC
 550 INC colour
 560 LDA colour
 570 AND #3
 580 CMP #3
 590 BNE cont_1
 600 LDA #0
 610 .cont_1
 620 STA colour
 630 JSR main
 640 LDY #0
 650 .sd_loop
 660 LDA dx,Y
 670 STA sx,Y
 680 INY
 690 CPY #4
 700 BNE sd_loop
 710 LDA size
 720 STA &70
 730 LDA size+1
 740 STA &71
 750 ASL &70
 760 ROL &71
 770 CLC
 780 LDA dx
 790 ADC &70
 800 STA dx
 810 LDA dx+1
 820 ADC &71
 830 STA dx+1
 840 CLC
 850 LDA dx
 860 ADC #20
 870 STA dx
 880 LDA dx+1
 890 ADC #0
 900 STA dx+1
 910 CLC
 920 LDA dx
 930 ADC &70
 940 STA &72
 950 LDA dx+1
 960 ADC &71
 970 CMP #4
 980 BCC until
 990 CMP #5
1000 BCS alter
1010 LDA &72
1020 CMP #246
1030 BCC until
1040 .alter
1050 CLC
1060 LDA size
1070 ADC #20
1080 STA dx
1090 LDA size+1
1100 ADC #0
1110 STA dx+1
1120 SEC
1130 LDA dy
1140 SBC &70
1150 STA dy
1160 LDA dy+1
1170 SBC &71
1180 STA dy+1
1190 SEC
1200 LDA dy
1210 SBC #72
1220 STA dy
1230 LDA dy+1
1240 SBC #0
1250 STA dy+1
1260 INC row
1270 .until
1280 LDA row
1290 CMP #4
1300 BEQ end
1310 JMP repeat
1320 .end
1330 RTS
1340 :
1350 .main
1360 LDX #sx MOD 256
1370 LDY #sx DIV 256
1380 JSR vdu29
1390 SEC
1400 LDA #0
1410 SBC size
1420 STA px
1430 LDA #0
```

```
1440 SBC size+1
1450 STA px+1
1460 .px_loop
1470 SEC
1480 LDA #0
1490 SBC size
1500 STA py
1510 LDA #0
1520 SBC size+1
1530 STA py+1
1540 .py_loop
1550 LDA #0
1560 STA count
1570 SEC
1580 LDA px
1590 SBC #8
1600 STA x
1610 LDA px+1
1620 SBC #0
1630 STA x+1
1640 CLC
1650 LDA px
1660 ADC #24
1670 STA top_x
1680 LDA px+1
1690 ADC #0
1700 STA top_x+1
1710 .x_loop
1720 SEC
1730 LDA py
1740 SBC #4
1750 STA y
1760 LDA py+1
1770 SBC #0
1780 STA y+1
1790 CLC
1800 LDA py
1810 ADC #12
1820 STA top_y
1830 LDA py+1
1840 ADC #0
1850 STA top_y+1
1860 .y_loop
1870 LDX #x MOD 256
1880 LDY #x DIV 256
1890 LDA #9
1900 JSR osword
1910 LDA point
1920 BEQ next_y
1930 INC count
1940 .next_y
1950 CLC
1960 LDA y
1970 ADC #8
1980 STA y
1990 LDA y+1
2000 ADC #0
2010 STA y+1
2020 CMP top_y+1
2030 BNE y_loop
2040 LDA y
2050 CMP top_y
2060 BNE y_loop
2070 CLC
2080 LDA x
2090 ADC #16
2100 STA x
2110 LDA x+1
2120 ADC #0
2130 STA x+1
2140 CMP top_x+1
2150 BNE x_loop
2160 LDA x
2170 CMP top_x
2180 BNE x_loop
2190 LDA px
2200 STA px2
2210 LDA px+1
2220 STA px2+1
2230 SEC
2240 LDA py
2250 SBC #8
2260 STA y2
2270 LDA py+1
2280 SBC #0
2290 STA y2+1
2300 CLC
2310 LDA py
2320 ADC #24
2330 STA top_y2
2340 LDA py+1
2350 ADC #0
2360 STA top_y2+1
2370 .y2_loop
2380 LDX #px2 MOD 256
2390 LDY #px2 DIV 256
2400 LDA #9
2410 JSR osword
2420 LDA point2
2430 BEQ next_y2
2440 INC count
2450 .next_y2
2460 CLC
2470 LDA y2
2480 ADC #16
2490 STA y2
2500 LDA y2+1
2510 ADC #0
2520 STA y2+1
2530 CMP top_y2+1
2540 BNE y2_loop
2550 LDA y2
2560 CMP top_y2
2570 BNE y2_loop
2580 LDX #px MOD 256
2590 LDY #px DIV 256
2600 LDA #9
2610 JSR osword
2620 INC colour
2630 LDA x
2640 CMP #0
2650 BEQ if2
2660 CMP colour
2670 BEQ if2
2680 TAX
2690 JSR plot
2700 .if2
2710 LDA x
2720 CMP #0
2730 BNE next_py
2740 LDA count
2750 AND #1
2760 CMP #1
2770 BNE next_py
2780 LDX colour
2790 JSR plot
2800 .next_py
2810 DEC colour
2820 CLC
2830 LDA py
2840 ADC #4
2850 STA py
2860 LDA py+1
2870 ADC #0
2880 STA py+1
2890 CMP size+1
2900 BEQ check_py
2910 JMP py_loop
2920 .check_py
2930 LDA py
2940 CMP size
2950 BEQ next_px
2960 JMP py_loop
2970 .next_px
2980 CLC
2990 LDA px
3000 ADC #4
3010 STA px
3020 LDA px+1
3030 ADC #0
3040 STA px+1
3050 CMP size+1
3060 BEQ check_px
3070 JMP px_loop
3080 .check_px
3090 LDA px
3100 CMP size
3110 BEQ endproc
3120 JMP px_loop
3130 .endproc
3140 RTS
3150 :
3160 .plot
3170 LDA #18
3180 JSR oswrch
3190 LDA #0
3200 JSR oswrch
3210 TXA
3220 JSR oswrch
3230 LDX #dx MOD 256
3240 LDY #dx DIV 256
3250 JSR vdu29
3260 LDA #25
3270 JSR oswrch
3280 LDA #69
3290 JSR oswrch
3300 LDA px
3310 JSR oswrch
3320 LDA px+1
3330 JSR oswrch
3340 LDA py
3350 JSR oswrch
3360 LDA py+1
3370 JSR oswrch
3380 LDX #sx MOD 256
3390 LDY #sx DIV 256
3400 :
3410 .vdu29
3420 STX &70
3430 STY &71
3440 LDY #0
3450 LDA #29
3460 JSR oswrch
3470 .vdu29_loop
3480 LDA (&70),Y
3490 JSR oswrch
3500 INY
3510 CPY #4
3520 BNE vdu29_loop
3530 RTS
3540 :
3550 .design
3560 LDX #255
3570 .text_loop
3580 INX
3590 LDA text,X
3600 JSR oswrch
3610 BNE text_loop
3620 .input
3630 JSR osrdch
3640 BCS input
3650 CMP #49
3660 BCC input
3670 CMP #52
3680 BCS input
3690 JSR oswrch
3700 AND #3
3710 ASL A
3720 TAY
3730 DEY
3740 DEY
3750 LDA table,Y
3760 STA &70
3770 INY
3780 LDA table,Y
3790 STA&71
3800 LDY #0
3810 .design_loop
3820 LDA (&70),Y
3830 JSR oswrch
3840 INY
3850 CPY #24
3860 BNE design_loop
3870 RTS
3880 :
3890 .palette
3900 STX vdu19
3910 STY vdu19+1
3920 LDX #vdu19 MOD 256
3930 LDY #vdu19 DIV 256
3940 LDA #12
3950 JMP osword
3960 :
3970 .vdu19  EQUB 1
3980         EQUB 3
3990         EQUB 0
4000         EQUB 0
4010         EQUB 0
4020 .sx     EQUW 64
4030 .sy     EQUW 900
4040 .dx     EQUW 108
4050 .dy     EQUW 900
4060 .size   EQUW 12
4070 .colour EQUB 2
4080 .row    EQUB 1
4090 .px     EQUW 0
4100 .py     EQUW 0
4110 .x      EQUW 0
4120 .y      EQUW 0
4130 .point  EQUB 0
4140 .cell   EQUW 0
4150 .top_x  EQUW 0
4160 .top_y  EQUW 0
4170 .count  EQUB 0
4180 .px2    EQUW 0
4190 .y2     EQUW 0
4200 .point2 EQUW 0
4210 .top_y2 EQUW 0
4220 .table  EQUW data1
4230         EQUW data2
4240         EQUW data3
4250 .text   EQUS "Which design (1, 2 o
r 3) -> "
4260         EQUB 0
4270 :
4280 .data1
4290 EQUB 25:EQUB 4:EQUW -4:EQUW -4
4300 EQUB 25:EQUB 0:EQUW 8:EQUW 0
4310 EQUB 25:EQUB 81:EQUW -8:EQUW 8
4320 EQUB 25:EQUB 81:EQUW 8:EQUW 0
4330 .data2
4340 EQUB 25:EQUB 4:EQUW -4:EQUW 0
4350 EQUB 25:EQUB 1:EQUW 8:EQUW 0
4360 EQUB 25:EQUB 1:EQUW -4:EQUW 4
4370 EQUB 25:EQUB 1:EQUW 0:EQUW -8
4380 .data3
4390 EQUB 25:EQUB 4:EQUW -4:EQUW -4
4400 EQUB 25:EQUB 1:EQUW 8:EQUW 8
4410 EQUB 25:EQUB 0:EQUW -8:EQUW 0
4420 EQUB 25:EQUB 1:EQUW 8:EQUW -8
4430 ]NEXT
4440 ENDPROC
4450 :
4460 DEF PROCrelocate
4470 PRINT "Relocating"
4480 *KEY 0 len%=TOP-PAGE:FOR loop%=0 T
O len% S.4:!(&E00+loop%)=!(PAGE+loop%):N
.|MPAGE=&E00|MRUN|M
4490 *FX 138,0,128
4500 END
```

Listing 6

```
10 REM >HexTwo8 (Info6)
20 REM By Paul Corke
30 REM for BBC B/B+/M/C/E/!65Host
40 REM (C) BAU Dec '91
50 :
60 IF PAGE>&E00 THEN PROCrelocate
70 :
80 osrdch=&FFE0
90 oswrch=&FFEE
100 osword=&FFF1
110 PROCassemble
120 CALL run
130 END
140 :
150 DEF PROCassemble
160 FOR pass=0 TO 2 STEP 2:P%=&2800
170 [OPT pass
180 .run
190 LDX #0
200 .first_loop
210 LDA vdus,X
220 JSR oswrch
230 INX
240 CPX #17
250 BNE first_loop
260 LDX #1
270 LDY #3
280 JSR vdu19
290 LDX #2
300 LDY #5
310 JSR vdu19
320 LDX #3
330 LDY #6
340 JSR vdu19
350 JSR design
360 .repeat
370 INC gen
380 LDX #255
390 .print
400 INX
410 LDA text,X
420 JSR oswrch
430 BNE print
440 LDA gen
450 PHA
460 CMP #10
470 BCC do_units
480 LDA #0
490 STA tens
500 .tens_loop
510 INC tens
520 SEC
530 LDA gen
540 SBC #10
550 STA gen
560 CMP #10
570 BCS tens_loop
580 LDA tens
590 ORA #48
600 JSR oswrch
610 .do_units
620 LDA gen
630 ORA #48
640 JSR oswrch
650 PLA
660 STA gen
670 INC colour
680 LDA colour
690 AND #3
700 CMP #3
710 BNE setcol
720 LDA #0
730 .setcol
740 STA colour
750 JSR main
760 CLC
770 LDA size
780 ADC #32
790 STA size
800 LDA size+1
810 ADC #0
820 STA size+1
830 BIT &FF
840 BPL repeat
850 RTS
860 :
870 .main
880 INC colour
890 CLC
900 LDA size
910 ADC #16
920 STA top
930 LDA size+1
940 ADC #0
950 STA top+1
960 SEC
970 LDA #0
980 SBC size
990 STA px
1000 LDA #0
1010 SBC size+1
1020 STA px+1
1030 .px_loop
1040 SEC
1050 LDA #0
1060 SBC size
1070 STA py
1080 LDA #0
1090 SBC size+1
1100 STA py+1
1110 .py_loop
1120 LDA #0
1130 STA count
1140 SEC
1150 LDA px
1160 SBC #32
1170 STA x
1180 LDA px+1
1190 SBC #0
1200 STA x+1
1210 CLC
1220 LDA px
1230 ADC #96
1240 STA top_px
1250 LDA px+1
1260 ADC #0
1270 STA top_px+1
1280 .x_loop
1290 SEC
1300 LDA py
1310 SBC #16
1320 STA y
1330 LDA py+1
1340 SBC #0
1350 STA y+1
1360 CLC
1370 LDA py
1380 ADC #48
1390 STA top_py
1400 LDA py+1
1410 ADC #0
1420 STA top_py+1
1430 .y_loop
```

```
1440 LDX #x MOD 256
1450 LDY #x DIV 256
1460 LDA #9
1470 JSR osword
1480 LDA point
1490 CMP #Ø
1500 BEQ next_y
1510 CMP colour
1520 BEQ next_y
1530 INC count
1540 .next_y
1550 CLC
1560 LDA y
1570 ADC #32
1580 STA y
1590 LDA y+1
1600 ADC #Ø
1610 STA y+1
1620 CMP top_py+1
1630 BNE y_loop
1640 LDA y
1650 CMP top_py
1660 BNE y_loop
1670 CLC
1680 LDA x
1690 ADC #64
1700 STA x
1710 LDA x+1
1720 ADC #Ø
1730 STA x+1
1740 CMP top_px+1
1750 BNE x_loop
1760 LDA x
1770 CMP top_px
1780 BNE x_loop
1790 LDA px
1800 STA px2
1810 LDA px+1
1820 STA px2+1
1830 SEC
1840 LDA py
1850 SBC #32
1860 STA y2
1870 LDA py+1
1880 SBC #Ø
1890 STA y2+1
1900 CLC
1910 LDA py
1920 ADC #96
1930 STA top_py
1940 LDA py+1
1950 ADC #Ø
1960 STA top_py+1
1970 .y_loop2
1980 LDX #px2 MOD 256
1990 LDY #px2 DIV 256
2000 LDA #9
2010 JSR osword
2020 LDA point2
2030 CMP #Ø
2040 BEQ next_y2
2050 CMP colour
2060 BEQ next_y2
2070 INC count
2080 .next_y2
2090 CLC
2100 LDA y2
2110 ADC #64
2120 STA y2
2130 LDA y2+1
2140 ADC #Ø
2150 STA y2+1
2160 CMP top_py+1
2170 BNE y_loop2
2180 LDA y2
2190 CMP top_py
2200 BNE y_loop2
2210 LDX #px MOD 256
2220 LDY #px DIV 256
2230 LDA #9
2240 JSR osword
2250 LDA point3
2260 STA cell
2270 CMP colour
2280 BNE if2
2290 LDX #Ø
2300 JSR block
2310 .if2
2320 LDA count
2330 AND #1
2340 CMP #1
2350 BNE next_py
2360 LDA cell
2370 CMP #Ø
2380 BNE next_py
2390 LDX colour
2400 JSR block
2410 .next_py
2420 CLC
2430 LDA py
2440 ADC #16
2450 STA py
2460 LDA py+1
2470 ADC #Ø
2480 STA py+1
2490 CMP top+1
2500 BEQ chek_py
2510 JMP py_loop
2520 .chek_py
2530 LDA py
2540 CMP top
2550 BEQ next_px
2560 JMP py_loop
2570 .next_px
2580 CLC
2590 LDA px
2600 ADC #16
2610 STA px
2620 LDA px+1
2630 ADC #Ø
2640 STA px+1
2650 CMP top+1
2660 BEQ chek_px
2670 JMP px_loop
2680 .chek_px
2690 LDA px
2700 CMP top
2710 BEQ endproc
2720 JMP px_loop
2730 .endproc
2740 DEC colour
2750 RTS
2760 :
2770 .design
2780 LDA #240
2790 STA px
2800 LDA #255
2810 STA px+1
2820 .px_loop_d
2830 LDA #240
2840 STA py
2850 LDA #255
2860 STA py+1
2870 .py_loop_d
2880 LDX #3
2890 JSR block
2900 CLC
2910 LDA py
2920 ADC #16
2930 STA py
2940 LDA py+1
2950 ADC #Ø
2960 STA py+1
2970 CMP #Ø
2980 BNE py_loop_d
2990 LDA py
3000 CMP #32
3010 BNE py_loop_d
3020 CLC
3030 LDA px
3040 ADC #16
3050 STA px
3060 LDA px+1
3070 ADC #Ø
3080 STA px+1
3090 CMP #Ø
3100 BNE px_loop_d
3110 LDA px
3120 CMP #32
3130 BNE px_loop_d
3140 RTS
3150 :
3160 .block
3170 LDA #18
3180 JSR oswrch
3190 LDA #Ø
3200 JSR oswrch
3210 TXA
3220 JSR oswrch
3230 SEC
3240 LDA px
3250 SBC #4
3260 STA &70
3270 LDA px+1
3280 SBC #Ø
3290 STA &71
3300 SEC
3310 LDA py
3320 SBC #4
3330 STA &72
3340 LDA py+1
3350 SBC #Ø
3360 STA &73
3370 LDA #25
3380 JSR oswrch
3390 LDA #4
3400 JSR oswrch
3410 LDX #Ø
3420 .block_loop
3430 LDA &70,X
3440 JSR oswrch
3450 INX
3460 CPX #4
3470 BNE block_loop
3480 LDY #Ø
3490 .block_loop2
3500 LDA square,Y
3510 JSR oswrch
3520 INY
3530 CPY #18
3540 BNE block_loop2
3550 RTS
3560 :
3570 .vdu19
3580 STX v19
3590 STY v19+1
3600 LDA #12
3610 LDX #v19 MOD 256
3620 LDY #v19 DIV 256
3630 JMP osword
3640 :
3650 .v19     EQUB 1
3660          EQUB 3
3670          EQUB Ø
3680          EQUB Ø
3690          EQUB Ø
3700 .size    EQUW 64
3710 .gen     EQUB Ø
3720 .colour EQUB Ø
3730 .px     EQUW Ø
3740 .py     EQUW Ø
3750 .point3 EQUB Ø
3760 .x      EQUW Ø
3770 .y      EQUW Ø
3780 .point  EQUB Ø
3790 .count  EQUB Ø
3800 .tens   EQUB Ø
3810 .px2    EQUW Ø
3820 .y2     EQUW Ø
3830 .point2 EQUB Ø
3840 .top    EQUW Ø
3850 .top_px EQUW Ø
3860 .top_py EQUW Ø
3870 .cell   EQUB Ø
3880 :
3890 .vdus   EQUB 22
3900         EQUB 1
3910         EQUB 23
3920         EQUB 1
3930         EQUD Ø
3940         EQUD Ø
3950         EQUB 29
3960         EQUW 640
3970         EQUW 512
3980 .text   EQUB 30
3990         EQUS "Generation "
4000         EQUB Ø
4010 .square EQUB 25:EQUB Ø:EQUW 8:EQUW
Ø
4020         EQUB 25:EQUB 81:EQUW -8:EQ
UW 8
4030         EQUB 25:EQUB 81:EQUW 8:EQU
W Ø
4040 ]NEXT
4050 ENDPROC
4060 :
4070 DEF PROCrelocate
4080 PRINT "Relocating"
4090 *KEY Ø len%=TOP-PAGE:FOR loop%=Ø T
O len% S.4:!(&EØØ+loop%)=!(PAGE+loop%):N
.|MPAGE=&EØØ|MRUN|M
4100 *FX 138,Ø,128
4110 END
```

Listing 7

```
10 REM >LocalErr1 (Info7)
20 REM Local error demo
30 REM by Dave Acton
40 REM for B/B+/M/C/E/A
50 REM (c) BAU Dec '91
60 :
70 MODE 7
80 PRINT"Simple editor - SHIFT ESC to
exit"
90 *FX 4,1
100 x%=Ø
110 y%=Ø
120 REPEAT
130 ON ERROR IF (ERR=17 AND INKEY-1) T
HEN PROCdone ELSE PROCglobalerr:GOTO 12Ø
140 VDU 28,Ø,20,39,2,31,x%,y%
150 REPEAT
160 key%=GET
170 IF key%>=32 AND key%<128 VDU key%
180 IF key%=13 PRINT
190 IF key%>=136 AND key%<=139 VDU key
%-128
200 x%=POS
210 y%=VPOS
220 IF key%=19 PROCsave
230 UNTIL key%=19
240 UNTIL FALSE
250 END
260 :
270 DEF PROCdone
280 VDU 26,12
290 END
300 :
310 DEF PROCsave
320 ON ERROR PROClocalerr:GOTO 12Ø
330 VDU 28,Ø,24,39,22,12
340 INPUTTAB(Ø,23)"Filename: "file$
350 OSCLI("SAVE "+file$+" 7CØØ +37Ø")
360 CLS
370 ENDPROC
380 :
390 DEF PROCglobalerr
400 VDU 28,Ø,24,39,22,12
410 PRINT CHR$129"Global error: ";
420 REPORT
430 PRINT CHR$133" - press a key"
440 key=GET
450 CLS
460 ENDPROC
470 :
480 DEF PROClocalerr
490 VDU 28,Ø,24,39,22,12
500 PRINT CHR$130"Local error: ";
510 REPORT
520 PRINT CHR$133" - press a key"
530 key=GET
540 CLS
550 ENDPROC
```

Listing 8

```
10 REM >LocalErr2 (Info8)
20 REM Local error demo
30 REM by Dave Acton
40 REM for Arc only
50 REM (c) BAU Dec '91
60 :
70 MODE Ø
80 ON ERROR PRINT"Global error: "REPO
RT$" at line ";ERL:END
90 PROCfred
100 PRINT SQR(-1):REM This will cause
an error!
110 END
120 :
130 DEF PROCfred
140 LOCAL ERROR
150 ON ERROR LOCAL PRINT" Error in PRO
Cfred: "REPORT$" at line ";ERL:RESTORE E
RROR:ENDPROC
160 PROCjim
170 PRINT"This is PROCfred"
180 PRINT 1/Ø:REM This will cause an e
rror!
190 RESTORE ERROR
200 ENDPROC
210 :
220 DEF PROCjim
230 LOCAL ERROR
240 ON ERROR LOCAL PRINT" Error in PRO
Cjim: "REPORT$" at line ";ERL:RESTORE ER
ROR:ENDPROC
250 PRINT"This is PROCjim"
260 THING:REM This will cause an error
!
270 RESTORE ERROR
280 ENDPROC
```

Listing 9

```
10 REM >Spin (Info9)
20 REM Sprite rotation
30 REM by Barry Wickett
40 REM for Arc only
50 REM (c) BAU Dec '91
60 :
70 PROCinit
80 FOR a=30 TO 330 STEP 60
90 PROCplot("riscos",SINRAD(a)*44+164
,COSRAD(a)*44+128,-a,Ø.5)
100 NEXT a
110 PRINTTAB(18,15);"press"
120 PRINTTAB(18,16);"space"
130 key=GET
140 a=Ø
150 REPEAT
160 a+=4
170 WAIT
180 SYS "OS_Byte",113,S%
190 S%=3-S%
200 SYS "OS_Byte",112,S%
210 VDU 26,12
220 IF a>300 AND a<1600 THEN
230 RECTANGLE 100,100,1076,820
240 VDU 24,104;104;1172;916;
250 PRINT TAB(14,14);CHR$(136);" A Win
dow ";CHR$(137)
260 PRINT TAB(11,16);"Spinning RiscOS
Demo"
270 PRINT TAB(13,18);"By Barry Wickett
"
280 ENDIF
290 PROCplot("riscos",SINRAD(a)*100+16
Ø,SINRAD(a*1.1)*80+135,a,Ø.25*SINRAD(a/2
)+Ø.5)
300 IF a>1700 AND a<2900 THEN PROCplot
("archimedesa",SINRAD(a*1.2)*100+160,SIN
RAD(a*1.3)*80+135,a,Ø.25*COSRAD(a/2)+Ø.5
)
310 UNTIL a=3000
320 MODE 13
330 END
340 :
350 DEF PROCinit
360 MODE 15
370 MODE 13
380 S%=2
390 OFF
400 filename$="PaintDemo"
410 SYS "OS_File",5,filename$ TO ,,,,e
xt%
420 ext%+=16
430 DIM sprite% ext%,code% 1000
440 !sprite%=ext%
450 sprite%!4=Ø
460 sprite%!8=16
470 sprite%!12=16
480 SYS "OS_SpriteOp",10+256,sprite%,f
ilename$
490 PROCmc
500 ENDPROC
510 :
520 DEF PROCmc
530 nc=127:dp=12
540 x=Ø:y=1:xl=2:yl=3:st=4:dx=5:dy=6
550 col=7:spd=8:scpos=9:cos=10:sin=11:
temp=12
560 FOR pass=Ø TO 2 STEP 2
570 P%=code%
580 [OPT pass
590         ADR     RØ,vdutable
600         ADR     R1,vduvars
610         SWI     "OS_ReadVduVariabl
es"
620         LDR     RØ,vduvars
630         LDR     R1,ix
640         LDR     R2,iy
650         ADD     RØ,RØ,R1
660         ADD     RØ,RØ,R2,LSL#6
670         ADD     RØ,RØ,R2,LSL#8
```

```
 680          STR     R0,vduvars
 690          LDR     R0,vduvars+4
 700          SUB     R0,R0,R1
 710          STR     R0,vduvars+4
 720          LDR     R0,vduvars+8
 730          MOV     R3,#255
 740          SUB     R0,R3,R0
 750          SUB     R0,R0,R2
 760          STR     R0,vduvars+8
 770          LDR     R0,vduvars+12
 780          SUB     R0,R0,R1
 790          STR     R0,vduvars+12
 800          LDR     R0,vduvars+16
 810          MOV     R3,#255
 820          SUB     R0,R3,R0
 830          SUB     R0,R0,R2
 840          STR     R0,vduvars+16
 850          MOV     R0,#40+256
 860          LDR     R1,spritedata
 870          ADR     R2,spritename
 880          SWI     "OS_SpriteOp"
 890          STR     R3,width
 900          STR     R4,height
 910          MOV     R0,#24+256
 920          LDR     R1,spritedata
 930          ADR     R2,spritename
 940          SWI     "OS_SpriteOp"
 950          LDR     R0,[R2,#32]
 960          ADD     R2,R2,R0
 970          STR     R2,spdata
 980          LDR     xl,width
 990          LDR     yl,height
1000          LDR     st,vduvars
1010          LDR     spd,spdata
1020          LDR     cos,cosine
1030          LDR     sin,sine
1040          MOV     y,#0
1050 .repeat1
1060          MOV     x,#0
1070 .repeat2
1080          LDRB     col,[spd,x]
1090          CMP     col,#0
1100          BEQ     skip
1110          MUL     dy,cos,y
1120          MUL     temp,sin,x
1130          SUB     dy,dy,temp
1140          MOV     dy,dy,ASR#dp
1150          MUL     dx,cos,x
1160          MUL     temp,sin,y
1170          ADD     dx,dx,temp
1180          MOV     dx,dx,ASR#dp
1190          LDR     temp,vduvars+4
1200          CMP     dx,temp
1210          BLT     skip
1220          LDR     temp,vduvars+16
1230          CMP     dy,temp
1240          BLT     skip
1250          LDR     temp,vduvars+12
1260          CMP     dx,temp
1270          BGT     skip
1280          LDR     temp,vduvars+8
1290          CMP     dy,temp
1300          BGT     skip
1310          ADD     scpos,st,dx
1320          ADD     scpos,scpos,dy,LSL
#6
1330          ADD     scpos,scpos,dy,LSL
#8
1340          STRB    col,[scpos]
1350 .skip
1360          ADD     x,x,#1
1370          CMP     x,xl
1380          BLT     repeat2
1390          ADD     spd,spd,xl
1400          ADD     y,y,#1
1410          CMP     y,yl
1420          BLT     repeat1
1430          MOV     PC,R14
1440
1450 .width  EQUD    0
1460 .height EQUD    0
1470 .spdata EQUD    0
1480 .cosine EQUD    0
1490 .sine   EQUD    0
1500 .ix     EQUD    0
1510 .iy     EQUD    0
1520 .spritedata
1530         EQUD    0
1540 .vdutable
1550         EQUD    148
1560         EQUD    128
1570         EQUD    129
1580         EQUD    130
1590         EQUD    131
1600         EQUD    -1
1610 .vduvars
1620         EQUD    0
1630         EQUD    0
1640         EQUD    0
1650         EQUD    0
1660         EQUD    0
1670 .spritename
1680         EQUS    ""
1690 ]
1700 NEXT pass
1710 ENDPROC
1720 :
1730 DEF PROCplot($spritename,!ix,!iy,a
ngle,scale)
1740 !cosine=COSRAD(angle)*2^dp*scale
1750 !sine=-SINRAD(angle)*2^dp*scale
1760 !spritedata=sprite%
1770 CALL code%
1780 ENDPROC
```

Listing 10

```
  10 REM >CSwitch (Info10)
  20 REM Low-level context switcher
  30 REM by Jon P Williams
  40 REM for B/B+/M/C/E
  50 REM (c) BAU Dec '91
  60 :
  70 MODE 7
  80 PRINT"Assembling...";
  90 FOR pass=0 TO 2 STEP 2
 100 P%=&900
 110 [OPT pass
 120 LDA #22
 130 JSR &FFEE
 140 LDA #7
 150 JSR &FFEE
 160 LDX #bee MOD 256
 170 LDY #bee DIV 256
 180 LDA #32
 190 JSR fork
 200 .ay
 210 LDY #0
 220 .ayloop
 230 JSR delay
 240 LDA #65
 250 STA &7C01,Y
 260 LDA #32
 270 STA &7C00,Y
 280 LDA #32
 290 STA &7D00
 300 INY
 310 JMP ayloop
 320 :
 330 .bee
 340 LDY #0
 350 .beloop
 360 JSR delay
 370 LDA #66
 380 STA &7D19,Y
 390 LDA #32
 400 STA &7D18,Y
 410 LDA #32
 420 STA &7E18
 430 INY
 440 JMP beloop
 450 :
 460 .delay
 470 LDX#0
 480 .deloop
 490 NOP:NOP:NOP:NOP
 500 NOP:NOP:NOP:NOP
 510 NOP:NOP:NOP:NOP
 520 NOP:NOP:NOP:NOP
 530 INX
 540 CPX #0
 550 BNE deloop
 560 RTS
 570 :
 580 .fork
 590 STA tmp
 600 SEI
 610 LDA #contextswitch MOD 256
 620 STA &206
 630 LDA #contextswitch DIV 256
 640 STA &207
 650 CLI
 660 PHP
 670 PLA
 680 STA psr
 690 STX pc
 700 STY pc+1
 710 LDX #249
 720 STX sp
 730 LDX #252
 740 LDA psr
 750 STA stack+1,X
 760 LDA pc
 770 STA stack+2,X
 780 LDA pc+1
 790 STA stack+3,X
 800 LDA #&40
 810 STA &FE6B
 820 LDA #&C0
 830 STA &FE6E
 840 LDA #&FF
 850 STA &FE66
 860 STA &FE64
 870 LDA tmp
 880 STA &FE67
 890 STA &FE65
 900 RTS
 910 :
 920 .oldvec
 930 EQUB 137
 940 EQUB 222
 950 .tmp
 960 EQUB 0
 970 .pc
 980 EQUW 0
 990 .psr
1000 EQUB 0
1010 .sp
1020 EQUB 0
1030 :
1040 .contextswitch
1050 LDA &FC
1060 PHA
1070 TYA
1080 PHA
1090 TXA
1100 PHA
1110 LDA &FE6D
1120 AND #64
1130 BEQ eoi
1140 LDA &FE64
1150 LDY #0
1160 .sloop
1170 LDA &100,Y
1180 TAX
1190 LDA stack,Y
1200 STA &100,Y
1210 TXA
1220 STA stack,Y
1230 INY
1240 CPY #0
1250 BNE sloop
1260 TSX
1270 LDA sp
1280 STX sp
1290 TAX
1300 TXS
1310 .eoi
1320 PLA
1330 TAX
1340 PLA
1350 TAY
1360 PLA
1370 STA &FC
1380 RTI
1390 :
1400 .stack
1410 ]
1420 FOR N%=P% TO P%+256:?N%=0:NEXT
1430 P%=P%+256
1440 [OPT pass
1450 .endcode
1460 ]
1470 NEXT pass
1480 CALL &900
1490 END
```

Listing 11

```
  10 MODE4:o=640:VDU29,o;512;:DIMx(o),y
(o),d(o):l=0:REPEATx(l+1)=x(l):y(l+1)=y(
l):d(l+1)=d(l)+RND(3)+2:l=l-(RND(3)=1):M
OVEx(l),y(l):x(l)=x(l)+8*(d(l)AND2)-8:y(
l)=y(l)+8*((d(l)+1)AND2)-8:p=POINT(x(l),
y(l))=0:d(l)=d(l)-(RND(20)=1)*(RND(3)+2)
:IFp DRAWx(l),y(l):UNTIL0 ELSEl=l-1:UNTI
Ll=0
```

Listing 12

```
  10 REM >Spoodle32 (Info12)
  20 REM by Dave Acton
  30 REM for Arc only
  40 REM (c) BAU Dec '91
  50 :
  60 MODE 12
  70 OFF:ORIGIN 640,512
  80 DIM dx(7),dy(7)
  90 FOR i=0 TO 7
 100 READ dx(i),dy(i)
 110 NEXT
 120 PROCspoodle(0,0,0,0)
 130 c=0
 140 REPEAT
 150 c=(c+14) MOD 15
 160 FOR del=1 TO 3
 170 WAIT:NEXT
 180 FOR d=0 TO 14
 190 e=(d+c)
 200 IF e>15 e-=15
 210 IF e>=8 e=15-e
 220 COLOUR d+1,&20*e,&20*e,&20*e
 230 NEXT
 240 UNTIL FALSE
 250 :
 260 DEF PROCspoodle(x,y,c,d)
 270 REPEAT
 280 IF RND(3)=1 PROCspoodle(x,y,c,d+RN
D(3))
 290 MOVE x,y
 300 x+=dx(d AND 7)
 310 y+=dy(d AND 7)
 320 IF RND(20)=1 d+=RND(3)
 330 p=POINT(x,y)=0
 340 IF p THEN
 350 GCOL c+1
 360 DRAW x,y
 370 c+=0.5
 380 IF c>=15 c-=15
 390 ENDIF
 400 UNTIL NOT p
 410 ENDPROC
 420 :
 430 DATA 0,8,8,8,8,0,8,-8
 440 DATA 0,-8,-8,-8,-8,0,-8,8
```

Listing 13

```
1L=L+4:IFL=36L=32:R. EL.IFL=4MO.1:x=640:
y=512:s=y:DIMX 40,Y 40:G.1EL.s=s/2:X!L=x
:Y!L=y:GC.3,129+L MOD3:V.24,x-s;y-s;x+s;
y+s;16:x=X!L-s:y=Y!L-s:GOS.1:x=X!L+s:y=Y
!L-s:GOS.1:x=X!L+s:y=Y!L+s:GOS.1:x=X!L-s
:y=Y!L+s:GOS.1:L=L-4:s=s*2:IFL>4R.
```

Graph

Listing 1

```
  10 REM >MakeApp (Graph1)
  20 REM Create application directory
  30 REM (c) BAU November 1991
  40 :
  50 PRINT "Creating application direct
ory"
  60 *CDIR $.!Graph
  70 *DIR  $.!Graph
  80 PROCcreaterunfile
  90 PROCcreatespritesandtemps
 100 PRINT "Application created, now pu
t !Runimage and WimpLib inside it."
 110 END
 120 :
 130 DEF PROCcreaterunfile
 140 *SPOOL !Run
 150 PRINT "| > !Graph !Runfile"
 160 PRINT "|"
 170 PRINT "Wimpslot -Min 128K -Max 128
K"
 180 PRINT "Set Graph$Dir <Obey$Dir>"
 190 PRINT "If ""<Font$Path>""="""" " "
THEN ERROR 0 Please double click on the
!Fonts directory"
 200 PRINT "Run ""<Graph$Dir>.!Runimage
"""
 210 PRINT "|"
 220 *SPOOL
 230 *Settype !Run Obey
 240 PRINT "Runfile created"
 250 ENDPROC
 260 :
 270 DEF PROCcreatespritesandtemps
 280 file%=OPENOUT "!Sprites"
 290 REPEAT
 300 READ number$
 310 IF number$<>"END OF SPRITE DATA" T
HEN
 320 number%=EVAL("&"+number$)
 330 BPUT #file%,number%
 340 ENDIF
 350 UNTIL number$="END OF SPRITE DATA"
 360 CLOSE #file%
 370 *SetType !Sprites Sprite
 380 PRINT "Sprites created"
 390 :
 400 file%=OPENOUT "Templates"
 410 REPEAT
 420 READ number$
 430 IF number$<>"END OF TEMPLATE DATA"
 THEN
 440 number%=EVAL("&"+number$)
 450 BPUT #file%,number%
 460 ENDIF
 470 UNTIL number$="END OF TEMPLATE DAT
A"
 480 CLOSE #file%
 490 *SetType Templates Template
 500 PRINT "Templates created"
 510 ENDPROC
 520 :
 530 REM SPRITE DATA
 540 DATA 01,00,00,00,10,00,00
 550 DATA 00,E4,02,00,00,D4,02
 560 DATA 00,00,21,67,72,61,70
 570 DATA 68,00,00,00,00,00,00
 580 DATA 04,00,00,00,10,00,00
 590 DATA 00,00,00,00,00,07,00
 600 DATA 00,00,2C,00,00,00,80
 610 DATA 01,00,00,0C,00,00,00
 620 DATA 77,77,77,77,77,77,77
 630 DATA 77,77,77,77,77,77,77
 640 DATA 77,77,77,00,00,00,77
 650 DATA 00,00,00,00,00,00,00
 660 DATA 00,00,00,00,00,00,00
 670 DATA 00,70,00,00,00,77,00
 680 DATA 00,00,00,00,00,00,00
 690 DATA 00,00,00,00,00,00,00
 700 DATA B0,00,00,00,77,00,00
 710 DATA 00,00,00,00,00,00,00
 720 DATA 00,00,00,00,00,00,7B
 730 DATA 00,00,00,77,22,22,22
 740 DATA 22,22,22,22,22,22,22
 750 DATA 22,22,22,22,B2,22,00
 760 DATA 00,00,77,00,00,00,00
 770 DATA 00,00,00,00,00,00,00
 780 DATA 00,00,00,0B,70,00,00
 790 DATA 00,77,00,00,00,00,00
 800 DATA 00,00,00,00,0B,00,00
 810 DATA 00,B0,00,70,00,00,00
 820 DATA 77,00,00,00,00,00,00
 830 DATA 00,00,B0,B0,00,00,00
 840 DATA 0B,00,70,00,00,00,77
 850 DATA 22,22,22,22,22,22,22
 860 DATA 22,2B,22,BB,22,B2,22
 870 DATA 22,22,00,00,00,77,00
 880 DATA 00,00,0B,00,00,00,B0
 890 DATA 00,00,00,0B,0B,00,00
 900 DATA 70,00,00,00,77,00,00
 910 DATA B0,B0,0B,00,00,B0,00
 920 DATA 00,00,B0,00,00,00,70
 930 DATA 00,00,00,77,00,00,0B
 940 DATA 00,B0,0B,00,0B,00,00
 950 DATA 00,00,00,00,00,70,00
 960 DATA 00,00,77,22,B2,22,22
 970 DATA 22,BB,B2,22,22,22,22
 980 DATA 22,22,22,22,22,00,00
```

```
990 DATA 00,77,00,0B,00,00,00
1000 DATA 00,0B,00,00,00,00,00
1010 DATA 00,00,00,70,00,00,00
1020 DATA 77,B0,00,00,00,00,00
1030 DATA 00,00,00,00,00,00,00
1040 DATA 00,00,70,00,00,00,77
1050 DATA 0B,00,00,00,00,00,00
1060 DATA 00,00,00,00,00,00,00
1070 DATA 00,70,00,00,00,77,77
1080 DATA 77,77,77,77,77,77,77
1090 DATA 77,77,77,77,77,77,77
1100 DATA 77,00,00,00,FF,00,00
1110 DATA 00,00,00,00,00,00,00
1120 DATA 00,00,00,00,00,00,00
1130 DATA FF,FF,FF,FF,00,00,00
1140 DATA 00,00,00,00,00,00,00
1150 DATA 00,00,00,00,00,00,FF
1160 DATA FF,FF,FF,00,00,00,00
1170 DATA 00,00,00,00,00,00,00
1180 DATA 00,00,00,00,F0,FF,FF
1190 DATA FF,FF,00,00,00,00,00
1200 DATA 00,00,00,00,00,00,00
1210 DATA 00,00,00,0F,FF,FF,FF
1220 DATA FF,FF,FF,FF,FF,FF,FF
1230 DATA FF,FF,FF,FF,FF,FF,FF
1240 DATA FF,FF,FF,FF,FF,FF,FF
1250 DATA 00,00,00,00,00,00,00
1260 DATA 00,00,00,00,00,00,00
1270 DATA 0F,00,FF,FF,FF,FF,00
1280 DATA 00,00,00,00,00,00,00
1290 DATA 00,0F,00,00,00,F0,00
1300 DATA 00,FF,FF,FF,FF,00,00
1310 DATA 00,00,00,00,00,00,F0
1320 DATA F0,00,00,00,0F,00,00
1330 DATA FF,FF,FF,FF,FF,FF,FF
1340 DATA FF,FF,FF,FF,FF,FF,FF
1350 DATA FF,FF,FF,FF,FF,FF,FF
1360 DATA FF,FF,FF,00,00,00,0F
1370 DATA 00,00,00,F0,00,00,00
1380 DATA 0F,0F,00,00,00,FF,FF
1390 DATA FF,FF,00,00,F0,F0,0F
1400 DATA 00,00,F0,00,00,00,F0
1410 DATA 00,00,00,00,FF,FF,FF
1420 DATA FF,00,00,0F,00,F0,00
1430 DATA 00,0F,00,00,00,00,00
1440 DATA 00,00,00,FF,FF,FF,FF
1450 DATA FF,FF,FF,FF,FF,FF,FF
1460 DATA FF,FF,FF,FF,FF,FF,FF
1470 DATA FF,FF,FF,FF,FF,FF,00
1480 DATA 0F,00,00,00,00,0F,00
1490 DATA 00,00,00,00,00,00,00
1500 DATA 00,FF,FF,FF,FF,F0,00
1510 DATA 00,00,00,00,00,00,00
1520 DATA 00,00,00,00,00,00,00
1530 DATA FF,FF,FF,FF,0F,00,00
1540 DATA 00,00,00,00,00,00,00
1550 DATA 00,00,00,00,00,00,FF
1560 DATA FF,FF,FF,FF,FF,FF,FF
1570 DATA FF,FF,FF,FF,FF,FF,FF
1580 DATA FF,FF,FF,FF,FF,FF,FF
1590 DATA FF,END OF SPRITE DATA
1600 :
1610 REM TEMPLATE DATA
1620 :
1630 DATA FF,FF,FF,FF,00,00,00
1640 DATA 00,00,00,00,00,00,00
1650 DATA 00,00,74,00,00,00,D4
1660 DATA 01,00,00,01,00,00,00
1670 DATA 49,6E,66,6F,0D,00,00
1680 DATA 00,00,00,00,00,48,02
1690 DATA 00,00,5E,00,00,00,01
1700 DATA 00,00,00,47,72,61,70
1710 DATA 68,0D,00,00,00,00,00
1720 DATA 00,A6,02,00,00,C2,00
1730 DATA 00,00,01,00,00,00,73
1740 DATA 61,76,65,61,73,0D,00
1750 DATA 00,00,00,00,68,03,00
1760 DATA 00,37,01,00,00,01,00
1770 DATA 00,00,4F,70,74,69,6F
1780 DATA 6E,73,0D,00,00,00,00
1790 DATA 00,00,00,00,38,00,00
1800 DATA 00,CC,02,00,00,2A,02
1810 DATA 00,00,D4,03,00,00,00
1820 DATA 00,00,00,00,00,00,00
1830 DATA 60,07,00,00,12,00,01
1840 DATA 84,07,02,07,01,03,01
1850 DATA 0C,00,00,00,00,00,00
1860 DATA FC,FF,FF,F4,01,00,00
1870 DATA 00,00,00,00,3D,00,00
1880 DATA 00,00,30,00,00,01,00
1890 DATA 00,00,E0,01,00,00,47
1900 DATA 72,61,70,68,20,49,6E
1910 DATA 66,6F,0D,00,0A,00,00
1920 DATA 00,0E,00,00,00,D0,FF
1930 DATA FF,FF,CA,00,00,00,F8
1940 DATA FF,FF,FF,19,00,00,17
1950 DATA 47,72,61,70,68,20,53
1960 DATA 69,7A,65,3A,0D,CA,00
1970 DATA 00,00,CC,FF,FF,FF,EC
1980 DATA 01,00,00,FC,FF,FF,FF
1990 DATA 3D,61,00,07,98,01,00
2000 DATA 00,FF,FF,FF,FF,10,00
2010 DATA 00,00,9A,00,00,00,30
2020 DATA FF,FF,FF,EC,01,00,00
2030 DATA 60,FF,FF,FF,3D,61,00
2040 DATA 07,A4,01,00,00,FF,FF
2050 DATA FF,FF,12,00,00,00,9A
2060 DATA 00,00,00,FC,FE,FF,FF
2070 DATA EC,01,00,00,2C,FF,FF
2080 DATA FF,3D,61,00,07,B0,01
2090 DATA 00,00,FF,FF,FF,FF,12
2100 DATA 00,00,00,0E,00,00,00
2110 DATA 9C,FF,FF,FF,9A,00,00
2120 DATA 00,C4,FF,FF,FF,19,00
2130 DATA 00,17,50,72,6F,67,72
2140 DATA 61,6D,3A,0D,3E,0D,FE
2150 DATA FE,FF,FF,FF,68,FF,FF
2160 DATA FF,9A,00,00,00,90,FF
2170 DATA FF,FF,19,00,00,17,46
2180 DATA 75,6E,63,74,69,6F,6E
2190 DATA 3A,0D,0D,FE,1E,00,00
2200 DATA 00,34,FF,FF,FF,9A,00
2210 DATA 00,00,5C,FF,FF,FF,19
2220 DATA 00,00,17,41,75,74,68
2230 DATA 6F,72,3A,0D,64,3E,0D
2240 DATA FE,0E,00,00,00,04,FF
2250 DATA FF,FF,9A,00,00,00,2C
2260 DATA FF,FF,FF,19,00,00,17
2270 DATA 56,65,72,73,69,6F,6E
2280 DATA 3A,0D,3E,0D,FE,9A,00
2290 DATA 00,00,64,FF,FF,FF,EC
2300 DATA 01,00,00,94,FF,FF,FF
2310 DATA 3D,61,00,07,C0,01,00
2320 DATA 00,FF,FF,FF,FF,12,00
2330 DATA 00,00,9A,00,00,00,98
2340 DATA FF,FF,FF,EC,01,00,00
2350 DATA C8,FF,FF,FF,3D,61,00
2360 DATA 07,CE,01,00,00,FF,FF
2370 DATA FF,FF,12,00,00,00,37
2380 DATA 2E,30,22,20,78,20,36
2390 DATA 2E,30,22,0D,4D,69,6B
2400 DATA 65,20,43,75,72,6E,6F
2410 DATA 77,0D,31,2E,31,30,20
2420 DATA 28,53,65,70,20,31,39
2430 DATA 39,31,29,0D,47,72,61
2440 DATA 70,68,20,50,6C,6F,74
2450 DATA 74,65,72,0D,47,72,61
2460 DATA 70,68,0D,04,01,00,00
2470 DATA 8C,02,00,00,6C,02,00
2480 DATA 00,F4,03,00,00,00,00
2490 DATA 00,00,00,00,00,00,64
2500 DATA 07,00,00,02,00,03,FF
2510 DATA 07,02,07,00,03,01,0C
2520 DATA 00,00,00,00,00,00,FC
2530 DATA FF,FF,00,05,00,00,00
2540 DATA 00,00,00,3D,01,00,00
2550 DATA 00,00,00,00,01,00,00
2560 DATA 00,0E,01,0E,01,58,00
2570 DATA 00,00,FF,FF,FF,FF,00
2580 DATA 01,00,00,00,00,00,00
2590 DATA 47,72,61,70,68,0D,84
2600 DATA 00,00,00,7C,01,00,00
2610 DATA 7A,01,00,00,24,02,00
2620 DATA 00,00,00,00,00,00,00
2630 DATA 00,00,70,07,00,00,93
2640 DATA 00,01,04,07,02,07,01
2650 DATA 04,0D,02,00,00,00,00
2660 DATA 00,00,FC,FF,FF,00,05
2670 DATA 00,00,00,00,00,00,3D
2680 DATA 00,00,00,00,00,00,00
2690 DATA 01,00,00,00,00,00,00
2700 DATA 00,53,61,76,65,20,61
2710 DATA 73,3A,0D,3E,0D,0D,03
2720 DATA 00,00,00,4E,00,00,00
2730 DATA A4,FF,FF,FF,8E,00,00
2740 DATA 00,EC,FF,FF,FF,02,60
2750 DATA 00,D7,66,69,6C,65,5F
2760 DATA 41,46,46,0D,3E,0D,64
2770 DATA 0A,00,00,00,60,FF,FF
2780 DATA FF,BA,00,00,00,90,FF
2790 DATA FF,FF,3D,F1,00,07,B8
2800 DATA 00,00,00,BE,00,00,00
2810 DATA 00,01,00,00,C0,00,00
2820 DATA 00,60,FF,FF,FF,EE,00
2830 DATA 00,00,90,FF,FF,FF,3D
2840 DATA 90,01,C7,4F,4B,0D,74
2850 DATA 69,74,6C,65,64,3E,0D
2860 DATA 64,47,72,61,70,68,0D
2870 DATA 61,7E,20,0D,86,00,00
2880 DATA 00,3C,01,00,00,86,01
2890 DATA 00,00,08,02,00,00,00
2900 DATA 00,00,00,00,00,00,00
2910 DATA 44,07,00,00,12,00,03
2920 DATA 84,07,02,07,01,03,01
2930 DATA 0C,00,00,00,00,00,2C
2940 DATA FF,FF,FF,00,01,00,00
2950 DATA 00,00,00,00,1D,00,00
2960 DATA 00,00,30,00,00,01,00
2970 DATA 00,00,78,00,98,00,4F
2980 DATA 70,74,69,6F,6E,73,0D
2990 DATA 64,3E,0D,65,04,00,00
3000 DATA 00,0A,00,00,00,CC,FF
3010 DATA FF,FF,E6,00,00,00,FC
3020 DATA FF,FF,FF,13,B1,00,17
3030 DATA D8,00,00,00,E3,00,00
3040 DATA 00,0B,00,00,00,0A,00
3050 DATA 00,00,9C,FF,FF,FF,BA
3060 DATA 00,00,00,CC,FF,FF,FF
3070 DATA 13,B1,00,17,F1,00,00
3080 DATA 00,FA,00,00,00,09,00
3090 DATA 00,00,0A,00,00,00,6C
3100 DATA FF,FF,FF,BA,00,00,00
3110 DATA 9C,FF,FF,FF,13,B1,00
3120 DATA 17,08,01,00,00,13,01
3130 DATA 00,00,0B,00,00,00,0A
3140 DATA 00,00,00,3C,FF,FF,FF
3150 DATA D6,00,00,00,6C,FF,FF
3160 DATA FF,13,B1,00,17,21,01
3170 DATA 00,00,29,01,00,00,0C
3180 DATA 00,00,00,20,54,72,75
3190 DATA 65,20,53,69,7A,65,0D
3200 DATA 73,6F,70,74,6F,6E,2C
3210 DATA 6F,70,74,6F,66,66,0D
3220 DATA 20,52,65,2D,53,69,7A
3230 DATA 65,0D,73,6F,70,74,6F
3240 DATA 66,66,2C,6F,70,74,6F
3250 DATA 6E,0D,20,42,61,72,20
3260 DATA 47,72,61,70,68,0D,73
3270 DATA 6F,70,74,6F,66,66,2C
3280 DATA 6F,70,74,6F,6E,0D,20
3290 DATA 33,64,20,42,61,72,0D
3300 DATA 73,6F,70,74,6F,66,66
3310 DATA 2C,6F,70,74,6F,6E,0D
3320 DATA END OF TEMPLATE DATA
```

Listing 2

```
10 REM >!RunImage (Graph2)
20 REM by Mike Curnow
30 REM for Arc only
40 REM (c) BAU December 91
50 :
60 LIBRARY"<Graph$Dir>.WIMPLIB"
70 PROCivar
80 PROCWimpInit("Graph",&400)
90 PROCinitfonts
100 PROCgf
110 PROCWimpOT("<Graph$Dir>.Templates")
120 E%=FNWimpLT(b%+800,b%+999,"Options")
130 Options%=FNWimpCW(b%)
140 E%=FNWimpLT(gn%,gn%+256,"Graph")
150 b%!44=-ly%
160 b%!48=lx%
170 Graph%=FNWimpCW(b%)
180 E%=FNWimpLT(fn%,fn%+260,"saveas")
190 SaveAs%=FNWimpCW(b%)
200 DIM Infoi% 107
210 Infosize%=Infoi%
220 E%=FNWimpLT(Infoi%,Infoi%+107,"Info")
230 Info%=FNWimpCW(b%)
240 PROCWimpCT
250 ON ERROR PROCWimpStop
260 ic%=FNIconTask("!Graph")
270 :
280 REPEAT
290 SYS"Wimp_Poll",1,b% TO C%
300 CASE C% OF
310 WHEN 1:PROCredrawwin(!b%)
320 WHEN 2:PROCopenw
330 WHEN 3:PROCCloseWin(!b%):IF !b%=Graph% go%=FALSE
340 WHEN 6:PROCCheckMouse(!b%,b%!4,b%!8,b%!12,b%!16)
350 WHEN 7:PROCsave
360 WHEN 9:PROCmenusel
370 WHEN 17,18:PROCusermsg(b%)
380 ENDCASE
390 UNTIL FALSE
400 :
410 DEF PROCopenw
420 sx%=b%!4:sy%=b%!8
430 IF RS% THEN px=(b%!12-sx%)/ox:py=(b%!16-sy%)/oy:PROCvar1:PROCvar2
440 SYS"Wimp_OpenWindow",,b%
450 PROCforce
460 ENDPROC
470 :
480 DEF PROCWimpEnd
490 PROClf
500 SYS"Wimp_CloseDown"
510 END
520 :
530 DEF PROCmenusel
540 PROCWimpSelect(b%,m$,B%)
550 IF m$="Reset Size" THEN px=7:py=5:PROCcscale
560 IF LEFT$(m$,5)="Fonts" AND b%!8>-1 THEN CASE b%!4 OF
570 WHEN 0:PROCnewfont(axmf,axisfont,b%!8)
580 WHEN 1:IF VAL($afi)>0 afsize=VAL($afi):PROClf:PROCgf:PROCforce
590 WHEN 2:PROCnewfont(scmf,scalefont,b%!8)
600 WHEN 3:IF VAL($sfi)>0 sfsize=VAL($sfi):PROClf:PROCgf:PROCforce
610 WHEN 4:PROCnewfont(timf,titlefont,b%!8)
620 WHEN 5:IF VAL($tfi)>0 tfsize=VAL($tfi):PROClf:PROCgf:PROCforce
630 ENDCASE
640 ENDPROC
650 :
660 DEF PROCusermsg(b%)
670 mc%=b%!16:CASE mc% OF
680 WHEN 0:PROCCloseWin(Graph%):PROCWimpEnd
690 WHEN 2:PROCdosave(TRUE)
700 WHEN 3:PROCdoload
710 ENDCASE
720 ENDPROC
730 :
740 DEF PROCCheckMouse(mousex%,mousey%,B%,handle%,icon%)
750 but%=B%
760 IF (but%AND2) AND handle%=-2 PROCcrmenu(0)
770 IF (but%AND5) AND handle%=Options% AND icon%=0 PROCtscale
780 IF (but%AND5) AND handle%=Options% AND icon%=1 PROCrscale
790 IF (but%AND5) AND handle%=Options% AND icon%=2 bar%=(bar%-1)MOD2:IF go% PROCvar2:PROCforce
800 IF (but%AND5) AND handle%=Options% AND icon%=3 bar3d%=(bar3d%-1)MOD2:IF go% PROCvar2:PROCforce
810 IF (but%AND4) AND handle%=Options% PROCWimpClM
820 IF (but%AND2) AND handle%=Graph% PROCcrmenu(1)
830 IF (but%AND&50) AND handle%=SaveAs% AND icon%=0 PROCWimpSSave
840 IF (but%AND5) AND handle%=SaveAs% AND icon%=2 PROCdosave(FALSE)
850 ENDPROC
860 :
870 DEF PROCcrmenu(T%)
880 LOCAL @%:@%=&1020104
890 $Infosize%=STR$(px)+""" x "+STR$(py)+""""+CHR$0
900 $afi=STR$(afsize):afsm=FNWimpMenu(-1,"$afi(8)","Size:")
910 $sfi=STR$(sfsize):sfsm=FNWimpMenu(-1,"$sfi(8)","Size:")
920 $tfi=STR$(tfsize):tfsm=FNWimpMenu(-1,"$tfi(8)","Size:")
930 fontmenu=FNWimpMenu(-1,"Axis Font>axmf,Axis Font Size>afsm,Scale Font>scmf,Scale Font Size>sfsm,Title Font>timf,Title Font Size>tfsm","Fonts:")
940 M$="Info>Info%,Options>Options%,Fonts>fontmenu,Reset Size"
950 IF T%=0 M$=M$+",Quit" ELSE M$=M$+",Save>SaveAs%"
960 M%=FNWimpMenu(T%,M$,taskn$)
970 ENDPROC
980 :
990 DEF PROCtscale
1000 IF TS% TS%=FALSE ELSE TS%=TRUE
1010 PROCcscale
1020 ENDPROC
1030 :
1040 DEF PROCrscale
1050 IF RS% RS%=FALSE ELSE RS%=TRUE
1060 PROCcscale
1070 ENDPROC
1080 :
1090 DEF PROCcscale
1100 PROCvar1:PROClf:PROCgf
1110 IF go% THEN PROCCloseWin(Graph%):PROCvar2
1120 IF RS% Y%=2048:X%=2560 ELSE Y%=ly%:X%=lx%
1130 PROCWimpSE(Graph%,0,-Y%,X%,0)
1140 IF go% PROCOpenWin(Graph%,sx%,sy%,sx%+sw%,sy%+sh%,0,0,-1):PROCforce
1150 ENDPROC
1160 :
1170 DEF PROCsave
1180 gn$=FNLeaf(FNGetStr(fn%))
1190 PROCWimpDoSave(gn$,&AFF)
1200 ENDPROC
1210 :
1220 DEF PROCdosave(D%)
1230 IF D% gn$=FNGetStr(b%+44) ELSE gn$=FNGetStr(fn%)
1240 IF INSTR(gn$,".")=0 Z%=FNWimpErr("To save, drag the file icon to a directory viewer"):ENDPROC
1250 LOCAL ERROR
1260 ON ERROR LOCAL
1270 Z%=FNWimpErr(REPORT$)
1280 ENDPROC
1290 $gn%=gn$
1300 $fn%=gn$
1310 df%=OPENOUT(gn$)
1320 RESTORE ERROR
1330 PROCHourOn
1340 BPUT#df%,"Draw";
1350 PROCWout(201)
1360 PROCWout(0):BPUT#df%,"Graph";
1370 PROCWout(0):PROCWout(0)
1380 PROCWout(px*di%)
1390 PROCWout(py*di%)
1400 Z%=PTR#df%
1410 PROCWout(0):PROCWout(0)
1420 BPUT#df%,1
1430 BPUT#df%,$fonts(axisfont);
1440 BPUT#df%,0
1450 font%(1,3)=1
1460 IF titlefont=axisfont font%(2,3)=1 ELSE BPUT#df%,2:BPUT#df%,$fonts(titlefont);:BPUT#df%,0:font%(2,3)=2
1470 IF scalefont=axisfont font%(3,3)=1 ELSE IF scalefont=titlefont font%(3,3)=2 ELSE BPUT#df%,3:BPUT#df%,$fonts(scalefont);:BPUT#df%,0:font%(3,3)=2:font%(3,3)=3
1480 PROCpad
1490 X%=PTR#df%
1500 PTR#df%=Z%+4
1510 PROCWout(X%-Z%)
1520 PTR#df%=X%
1530 PROCdtext(2,adx%+vx/2*di%,(py-0.15)*di%,title$,1)
1540 IF LEN(xaxis$)>0 PROCdtext(1,adx%+vx/2*di%,0.15*di%,xaxis$,1)
1550 L%=LEN(yaxis$)
1560 IF L%>0 Y%=ady%+(vy/2+L%/16)*di%:FOR I%=1 TO L%:PROCdtext(1,0.1*di%,Y%-I%*di%/8,MID$(yaxis$,I%,1),1):NEXT
1570 PROCstartg
1580 FOR gr%=1 TO ng%
1590 FOR P%=1 TO nxy%(gr%)
1600 xd=X(d%)-xlo:yd=Y(d%)-ylo
1610 d%+=1
1620 IF bar% THEN PROCsbar ELSE PROCsgraph
1630 first%=FALSE
1640 NEXT
```

```
1650 IF bar% THEN PROCsbar2 ELSE PROCWout(0)
1660 first%=TRUE
1670 NEXT
1680 PROCphdr(3,adx%,ady%,di%*px,di%*py,-1,0,256,0)
1690 PROCpthm(adx%,aym%)
1700 PROCpthd(adx%,ady%)
1710 PROCpthd(axm%,ady%)
1720 PROCWout(0):REM AXIS
1730 IF xtext% AND bar% o%=bw/2*di% ELSE o%=0
1740 PROCphdr(xg%*2*(xtext%+1)+yg%*2+nxg%*2+nyg%*2,adx%,ady%,di%*px,di%*py,-1,0,64,0)
1750 X=vx/xg%*di%:Y=vy/yg%*di%
1760 X%=0.04*di%
1770 Y%=0.04*di%:REM Minor grid
1780 IF NOT(xtext%) FOR I%=1 TO xg%:PROCpthm(adx%+X*I%,ady%):PROCpthd(adx%+X*I%,ady%-Y%):NEXT
1790 FOR I%=1 TO yg%
1800 PROCpthm(adx%,ady%+Y*I%)
1810 PROCpthd(adx%-X%,ady%+Y*I%)
1820 NEXT
1830 X=vx/nxg%*di%
1840 Y=vy/nyg%*di%
1850 X%=0.07*di%
1860 Y%=0.07*di%:REM Major grid
1870 FOR I%=1 TO nxg%
1880 PROCpthm(adx%+X*(I%-xtext%*bar%)+o%,ady%)
1890 PROCpthd(adx%+X*(I%-xtext%*bar%)+o%,ady%-Y%)
1900 NEXT
1910 FOR I%=1 TO nyg%
1920 PROCpthm(adx%,ady%+Y*I%)
1930 PROCpthd(adx%-X%,ady%+Y*I%)
1940 NEXT
1950 PROCWout(0)
1960 FOR I%=0 TO nxg%
1970 PROCdtext(3,adx%+X*I%+o%,ady%-0.2*di%,x$(I%),1)
1980 NEXT
1990 y=yr/nyg%
2000 FOR I%=0 TO nyg%
2010 PROCdtext(3,adx%-0.1*di%,ady%-1800+Y*I%,STR$(ylo+I%*y),2)
2020 NEXT
2030 CLOSE#df%
2040 OSCLI("SETTYPE "+gn$+" AFF")
2050 IF D% PROCWimpAckSave
2060 IF but%AND&44 PROCWimpClM
2070 PROCWimpNewTitle(Graph%)
2080 PROCHourSmash
2090 ENDPROC
2100 :
2110 DEF PROCsgraph
2120 IF first%=TRUE THEN
2130 PROCphdr(nxy%(gr%),adx%,ady%,axm%,aym%,-1,0,64,0)
2140 PROCpthm(xd*xsd+adx%,yd*ysd+ady%)
2150 ELSE PROCpthd(xd*xsd+adx%,yd*ysd+ady%)
2160 ENDIF
2170 ENDPROC
2180 :
2190 DEF PROCsbar
2200 IF first% AND gr%>1 PROCsbar2
2210 IF xd>=xinc*(i%+1) THEN
2220 IF c%>0 d(i%)=d(i%)/c%:c%=0
2230 i%=xd/xinc
2240 ENDIF
2250 c%+=1:d(i%)+=yd
2260 ENDPROC
2270 :
2280 DEF PROCsbar2
2290 IF c%>0 d(i%)=d(i%)/c%
2300 IF bar3d% THEN
2310 bw3d=bw/4*di%
2320 FOR I%=0 TO i%
2330 x%=adx%+bw*I%*di%+bw3d
2340 y%=ady%+d(I%)*ysd
2350 PROCphdr(4,adx%,ady%,axm%,aym%,&9F9F9F00,0,100,0)
2360 PROCpthm(x%,ady%)
2370 PROCpthd(x%,y%)
2380 PROCpthd(x%+bw3d*2,y%)
2390 PROCpthd(x%+bw3d*2,ady%)
2400 PROCWout(0)
2410 PROCphdr(4,adx%,ady%,axm%,aym%,&5F5F5F00,0,100,0)
2420 PROCpthm(x%+bw3d*2,ady%)
2430 PROCpthd(x%+bw3d*3,ady%+bw3d)
2440 PROCpthd(x%+bw3d*3,y%+bw3d)
2450 PROCpthd(x%+bw3d*2,y%)
2460 PROCWout(0)
2470 PROCphdr(4,adx%,ady%,axm%,aym%,&BFBFBF00,0,100,0)
2480 PROCpthm(x%,y%)
2490 PROCpthd(x%+bw3d,y%+bw3d)
2500 PROCpthd(x%+bw3d*3,y%+bw3d)
2510 PROCpthd(x%+bw3d*2,y%)
2520 PROCWout(0)
2530 NEXT
2540 ELSE
2550 PROCphdr((i%+1)*4,adx%,ady%,axm%,aym%,-1,0,100,0)
2560 FOR I%=0 TO i%
2570 PROCpthm(adx%+bw*I%*di%,ady%)
2580 PROCpthd(adx%+bw*I%*di%,ady%+d(I%)*ysd)
2590 PROCpthd(adx%+bw*(I%+1)*di%,ady%+d(I%)*ysd)
2600 PROCpthd(adx%+bw*(I%+1)*di%,ady%)
2610 NEXT
2620 PROCWout(0)
2630 ENDIF
2640 i%=0
2650 d()=0
2660 c%=0
2670 ENDPROC
2680 :
2690 DEF PROCpad
2700 WHILE PTR#df%AND3
2710 BPUT#df%,0
2720 ENDWHILE
2730 ENDPROC
2740 :
2750 DEF PROCdoload
2760 PROCCloseWin(Graph%)
2770 go%=FALSE:xfn$=fn$
2780 fn$=FNGetStr(b%+44)
2790 i%=b%!40
2800 IF i%=&FFD OR i%=&FFF ELSE Z%=FNWimpErr(fn$+" is not DATA or TEXT"):ENDPROC
2810 gf%=OPENIN(fn$)
2820 PROCHourOn
2830 ln%=0
2840 maxX=-1.7E38:minX=1.7E38
2850 minY=minX:maxY=maxX
2860 ec%=0:numXY%=0
2870 xmin=minX:xmax=maxX
2880 ymax=maxY:ymin=minY
2890 nxy%()=0
2900 PROCstartg
2910 title$=" ":xaxis$=""
2920 yaxis$=""
2930 xtext%=FALSE
2940 xdiv%=0:ydiv%=0
2950 x$()=""
2960 REPEAT
2970 PROCGetln
2980 ln%+=1
2990 IF FNgcmd=FALSE THEN
3000 X(d%)=xd
3010 Y(d%)=yd
3020 d%+=1
3030 nxy%(gr%)+=1
3040 IF xd>maxX maxX=xd
3050 IF xd<minX minX=xd
3060 IF yd>maxY maxY=yd
3070 IF yd<minY minY=yd
3080 ENDIF
3090 UNTIL EOF#gf% OR ec%>9 OR d%>Maxdata
3100 CLOSE#gf%
3110 IF ec%>0 fn$="":ENDPROC
3120 ng%=gr%
3130 PROCrnd(minX,xmin,maxX,xmax,xtext%)
3140 PROCrnd(minY,ymin,maxY,ymax,FALSE)
3150 PROCvar2
3160 IF fn$<>xfn$ $fn%="Graph"+CHR$0:$gn%="Graph"+CHR$0
3170 PROCOpenWin(Graph%,sx%,sy%,sx%+sw%,sy%+sh%,0,0,-1)
3180 PROCforce
3190 ENDPROC
3200 :
3210 DEF PROCstartg
3220 gr%=0
3230 first%=TRUE
3240 n%=0
3250 d()=0
3260 i%=0:c%=0:d%=0
3270 ENDPROC
3280 :
3290 DEF PROCGetln
3300 x$=GET$#gf%:y$=""
3310 I%=INSTR(x$,","):IF I%>0 y$=MID$(x$,I%+1):x$=LEFT$(x$,I%-1)
3320 xd=VAL(x$):yd=VAL(y$)
3330 IF RIGHT$(x$)="""" x$=LEFT$(x$)
3340 IF LEFT$(x$,1)="""" x$=MID$(x$,2)
3350 IF RIGHT$(y$)="""" y$=LEFT$(y$)
3360 IF LEFT$(y$,1)="""" y$=MID$(y$,2)
3370 ENDPROC
3380 :
3390 DEF PROCrnd(RETURN m,RETURN u,RETURN n,RETURN v,text%)
3400 LOCAL S%,lm,ln,L%,D%
3410 IF u>m u=m ELSE m=u
3420 IF v<n v=n ELSE n=v
3430 IF text% ENDPROC
3440 D%=INT(LOG(ABS(n-m)))
3450 IF m=0 lm=1<<31 ELSE lm=LOG(ABS(m))
3460 IF n=0 ln=1<<31 ELSE ln=LOG(ABS(n))
3470 IF ln>lm L%=INT(ln) ELSE L%=INT(lm)
3480 PROCrnd2(u,FALSE,lm)
3490 PROCrnd2(v,TRUE,ln)
3500 ENDPROC
3510 :
3520 DEF PROCrnd2(RETURN x,U%,z)
3530 IF x<0 S%=-1:U%=(U%-1)MOD2 ELSE S%=1
3540 x=INT(10^(z-D%)-U%*.99999999)*10^D%*S%
3550 ENDPROC
3560 :
3570 DEFFNgcmd
3580 LOCALc$
3590 c$=FNupp(x$)
3600 Z%=TRUE
3610 nv%=2
3620 IF LEFT$(x$,1)="|" THEN =TRUE
3630 CASE c$ OF
3640 WHEN "TITLE":title$=y$
3650 WHEN "XAXIS":xaxis$=y$
3660 WHEN "YAXIS":yaxis$=y$
3670 WHEN "XMIN":xmin=yd
3680 WHEN "XMAX":xmax=yd
3690 WHEN "YMIN":ymin=yd
3700 WHEN "YMAX":ymax=yd
3710 WHEN "XLABEL":PROCgetxtext
3720 WHEN "XDIV":xdiv%=yd
3730 WHEN "YDIV":ydiv%=yd
3740 WHEN "NEWPLOT":first%=TRUE:gr%+=1:n%=0:nv%=1
3750 OTHERWISE:Z%=FALSE:n%+=1:IF gr%=0 gr%=1
3760 ENDCASE
3770 IF y$="" AND nv%>1 THEN Z%=FNWimpErr("Unrecognised data at line "+STR$(ln%)):ec%+=1
3780 =Z%
3790 :
3800 DEF PROCgetxtext
3810 xdiv%=0
3820 REPEAT
3830 I%=INSTR(y$,",")
3840 IF I%>0 x$(xdiv%)=LEFT$(y$,I%-1):y$=MID$(y$,I%+1) ELSE x$(xdiv%)=y$
3850 xdiv%+=1
3860 UNTIL I%=0
3870 xtext%=TRUE:nv%=1
3880 ENDPROC
3890 :
3900 DEFFNupp(x$)
3910 FOR Z%=1 TO LEN(x$)
3920 MID$(x$,Z%,1)=CHR$(ASC(MID$(x$,Z%,1))AND&5F)
3930 NEXT
3940 =x$
3950 :
3960 DEF PROCforce
3970 SYS"Wimp_ForceRedraw",Graph%,0,0-sh%,sw%,0
3980 ENDPROC
3990 :
4000 DEF PROCredrawwin(h%)
4010 LOCAL f%,i%,w%,x%,y%
4020 !b%=h%
4030 PROCfontscale(osmp)
4040 SYS"Wimp_RedrawWindow",,b% TO f%
4050 WHILE f%
4060 x%=(b%!4)-(b%!20)
4070 y%=(b%!16)-(b%!24):REM Work Unit Origin
4080 PROCdrawg
4090 !b%=h%
4100 SYS"Wimp_GetRectangle",,b% TO f%
4110 ENDWHILE
4120 PROCfontscale(400)
4130 go%=TRUE
4140 ENDPROC
4150 :
4160 DEF PROCdrawg
4170 PROCHourOn
4180 axo%=x%+ax%
4190 ayo%=y%+ay%:REM Axis origin
4200 GCOL0,7
4210 MOVE axo%,ayo%+gy%
4220 DRAWBY 0,-gy%
4230 DRAWBY gx%,0
4240 IF LEN(title$)>0 PROCptext(2,axo%+vx/2*ox,y%-0.15*oy,title$,1)
4250 IF LEN(xaxis$)>0 PROCptext(1,axo%+vx/2*ox,ayo%-0.5*oy,xaxis$,1)
4260 L%=LEN(yaxis$)
4270 IF L%>0 Y%=ayo%+gy%/2+L%/2*oy/8:FOR I%=1 TO L%:PROCptext(1,x%+0.1*ox,Y%-I%*oy/8,MID$(yaxis$,I%,1),1):NEXT
4280 PROCstartg
4290 FOR gr%=1 TO ng%
4300 FOR P%=1 TO nxy%(gr%)
4310 xd=X(d%):yd=Y(d%):d%+=1
4320 IF bar% PROCpbar ELSE PROCpgraph
4330 lx=xd
4340 ly=yd
4350 first%=FALSE
4360 NEXT
4370 IF bar% PROCpbar2
4380 first%=TRUE
4390 NEXT
4400 IF xtext% AND bar% o%=bw/2*ox ELSE o%=0
4410 X=gx%/xg%
4420 Y=gy%/yg%
4430 X%=0.04*ox
4440 Y%=0.04*oy:REM Minor grid
4450 IF NOT(xtext%) FOR I%=1 TO xg%:MOVE axo%+X*I%,ayo%:DRAWBY 0,-Y%:NEXT
4460 FOR I%=1 TO yg%
4470 MOVE axo%,ayo%+Y*I%
4480 DRAWBY -X%,0
4490 NEXT
4500 X=gx%/nxg%
4510 Y=gy%/nyg%
4520 X%=0.07*ox
4530 Y%=0.07*oy:REM Major grid
4540 FOR I%=1 TO nxg%
4550 MOVE axo%+X*(I%-xtext%*bar%)+o%,ayo%
4560 DRAWBY 0,-Y%
4570 NEXT
4580 FOR I%=1 TO nyg%
4590 MOVE axo%,ayo%+Y*I%
4600 DRAWBY -X%,0
4610 NEXT
4620 FOR I%=0 TO nxg%
4630 PROCptext(3,axo%+X*I%+o%,ayo%-0.2*ox,x$(I%),1)
4640 NEXT
4650 y=yr/nyg%
4660 FOR I%=0 TO nyg%
4670 PROCptext(3,axo%-0.1*ox,ayo%-8+Y*I%,STR$(ylo+I%*y),2)
4680 NEXT
4690 PROCHourSmash
4700 ENDPROC
4710 :
4720 DEF PROCpgraph
4730 IF first% THEN MOVEaxo%+(xd-xlo)*xs,ayo%+(yd-ylo)*ys ELSE DRAWBY(xd-lx)*xs,(yd-ly)*ys
4740 ENDPROC
4750 :
4760 DEF PROCpbar
4770 IF xd>=xlo+xinc*(i%+1) THEN
4780 IF c%>0 d(i%)=d(i%)/c%:c%=0
4790 i%=(xd-xlo)/xinc
4800 ENDIF
4810 c%+=1:d(i%)+=(yd-ylo)
4820 ENDPROC
4830 :
4840 DEF PROCpbar2
4850 IF c%>0 d(i%)=d(i%)/c%
4860 IF bar3d% THEN
4870 bw3x=bw/4*ox:bw3y=bw/4*oy
4880 FOR I%=0 TO i%
4890 SYS"Wimp_SetColour",3
4900 RECTANGLEFILL axo%+bw*ox*I%+bw3x,ayo%,bw3x*2,d(I%)*ys
4910 SYS"Wimp_SetColour",5
4920 MOVE axo%+bw*ox*I%+bw3x*3,ayo%
4930 MOVEBY bw3x,bw3y
4940 PLOT &71,0,d(I%)*ys
4950 SYS"Wimp_SetColour",2
4960 MOVE axo%+bw*ox*I%+bw3x,ayo%+d(I%)*ys
4970 MOVEBY bw3x,bw3y
4980 PLOT &71,bw3x*2,0
4990 SYS"Wimp_SetColour",7
5000 RECTANGLE axo%+bw*ox*I%+bw3x,ayo%,bw3x*2,d(I%)*ys
5010 MOVE axo%+bw*I%*ox+bw3x*3,ayo%
5020 DRAWBY bw3x,bw3y
5030 DRAWBY 0,d(I%)*ys
5040 DRAWBY -bw3x,-bw3y
5050 MOVE axo%+bw*I%*ox+bw3x,d(I%)*ys+ayo%
5060 DRAWBY bw3x,bw3y
5070 DRAWBY bw3x*2,0
5080 NEXT
5090 ELSE
5100 FOR I%=0 TO i%
5110 RECTANGLE axo%+bw*I%*ox,ayo%,bw*ox,d(I%)*ys
5120 NEXT
5130 ENDIF
5140 i%=0:d()=0:c%=0
5150 ENDPROC
5160 :
5170 REM Font, x, y (OS units), text, Align : 0=Left, 1=Mid, 2=Right
5180 :
5190 DEF PROCptext(f%,x%,y%,t$,a%)
5200 LOCAL X%:X%=FNftext(t$,f%)
5210 x%=x%*osmp-(X% DIV2)*a%
5220 SYS"Font_Paint",,t$,0,x%,y%*osmp
5230 ENDPROC
5240 :
5250 DEF PROCWout(w%)
5260 LOCAL I%
5270 FOR I%=0 TO 3
5280 BPUT#df%,w%
5290 w%=w%>>8
5300 NEXT
5310 ENDPROC
5320 :
5330 REM Draw Path Header
5340 REM No.points,x0,y0,x1,y1,Fill clr,Outline clr,width,style
5350 :
5360 DEF PROCphdr(n%,x0%,y0%,x1%,y1%,f%,o%,w%,s%)
5370 PROCWout(2)
5380 PROCWout(n%*12+24+20)
5390 PROCWout(x0%):PROCWout(y0%)
5400 PROCWout(x1%):PROCWout(y1%)
5410 PROCWout(f%):PROCWout(o%)
5420 PROCWout(w%):PROCWout(s%)
5430 ENDPROC
5440 :
5450 REM Path Move
5460 :
5470 DEF PROCpthm(x%,y%)
5480 PROCWout(2):PROCWout(x%)
5490 PROCWout(y%)
5500 ENDPROC
5510 :
5520 REM Path Draw
5530 DEF PROCpthd(x%,y%)
5540 PROCWout(8):PROCWout(x%)
5550 PROCWout(y%)
5560 ENDPROC
5570 :
5580 REM Font, x, y, text, Align : 0=Left, 1=Mid, 2=Right
5590 :
5600 DEF PROCdtext(f%,x%,y%,t$,a%)
```




```
5610 LOCAL L%,pd%,X%
5620 X%=FNftext(t$,f%)
5630 X%=X%*mpdi
5640 x%-=(X% DIV2)*a%
5650 pd%=font%(f%,1)*640
5660 t$+=CHR$0
5670 L%=(LEN(t$)+3)AND&FFFFFFFC
5680 PROCWout(1):PROCWout(L%+24+28)
5690 PROCWout(x%):PROCWout(y%)
5700 PROCWout(x%+X%):PROCWout(y%+pd%)
5710 PROCWout(0):PROCWout(&FFFFFF00)
5720 PROCWout(font%(f%,3)):PROCWout(pd%)
5730 PROCWout(pd%):PROCWout(x%)
5740 PROCWout(y%)
5750 BPUT#df%,t$;
5760 PROCpad
5770 ENDPROC
5780 :
5790 DEFFNftext(t$,f%)
5800 SYS"Font_SetFont",font%(f%,2)
5810 SYS"Font_StringBBox",,t$ TO,,,Z%
5820 =Z%
5830 :
5840 DEF PROCgf
5850 PROCfontscale(osmp)
5860 PROCff(axisfont,afsize,1)
5870 PROCff(titlefont,tfsize,2)
5880 PROCff(scalefont,sfsize,3)
5890 PROCfontscale(400)
5900 ENDPROC
5910 :
5920 DEF PROCff(n%,p%,f%)
5930 SYS"Font_FindFont",,$fonts(n%),p%*16,p%*16,0,0 TO font%(f%,2)
5940 font%(f%,1)=p%
5950 font%(f%,0)=n%
5960 ENDPROC
5970 :
5980 DEF PROClf
5990 FOR Z%=1 TO 3
6000 SYS"Font_LoseFont",font%(Z%,2)
6010 NEXT
6020 ENDPROC
6030 :
6040 DEF PROCfontscale(X%)
6050 SYS"Font_SetScaleFactor",,X%,X%
6060 ENDPROC
6070 :
6080 DEF PROCivar
6090 sw=9.5:sh=7.5: REM Real screen size in inches
6100 px=7:py=5:    REM Default Graph Physical Height/Width
6110 sx%=0:sy%=200: REM Initial Window posn
6120 Maxdata=2000:  REM Max data vars
6130 fn$=""
6140 go%=FALSE
6150 @%=&FF000608
6160 TS%=TRUE
6170 RS%=FALSE
6180 bar%=FALSE
6190 bar3d%=FALSE
6200 PROCvar1
6210 DIM fn% 260,gn% 260,nxy%(10),d(100),g%(9,7),x$(30),X(Maxdata),Y(Maxdata)
6220 FOR I%=0 TO 9
6230 FOR J%=0 TO 7
6240 READ g%(I%,J%)
6250 NEXT
6260 NEXT
6270 DATA 1,1,1,1,1,1,1,1
6280 DATA 20,10,5,4,2,1,1,1
6290 DATA 20,10,5,4,2,1,1,1
6300 DATA 30,15,10,6,3,2,1,1
6310 DATA 24,20,12,8,4,2,1,1
6320 DATA 25,20,10,5,2,1,1,1
6330 DATA 24,12,6,3,2,1,1,1
6340 DATA 14,7,2,1,1,1,1,1
6350 DATA 16,8,4,2,1,1,1,1
6360 DATA 18,9,3,1,1,1,1,1
6370 ENDPROC
6380 :
6390 DEF PROCvar1
6400 IF TS% ox=1280/sw:oy=1024/sh ELSE ox=180:oy=180:REM OS Units Per inch
6410 di%=180*256:        REM Draw units per inch
6420 mpdi=di%/72000:     REM Conversion for millipoints to draw units
6430 osmp=72000/ox:      REM Conversion for OS units to millipoints
6440 vx=px-1:vy=py-1:    REM Visible plotted graph size
6450 lx%=ox*px:ly%=oy*py:REM Total Graph size in OS Units
6460 gx%=ox*vx:gy%=oy*vy:REM Actual graph size
6470 ax%=ox*.75:ay%=-(py-.65)*oy:REM Axis Coordinates Relative to work origin
6480 adx%=di%*.75:ady%=di%*.65:axm%=adx%+vx*di%:aym%=ady%+vy*di%:REM Axis Coordinates - Draw units
6490 ENDPROC
6500 :
6510 DEF PROCvar2
6520 nxg%=0:xg%=0
6530 nyg%=0:yg%=0
6540 xlo=0:xhi=0
6550 ylo=0:yhi=0
6560 xr=0:yr=0
6570 PROCgrid(minX,maxX,xmin,xmax,xlo,xhi,xr,vx,nxg%,xg%,xdiv%)
6580 IF NOT xtext% x=xr/nxg%:FOR I%=0 TO nxg%:x$(I%)=STR$(xlo+I%*x):NEXT
6590 IF nxg%>nval% AND NOT xtext% nval%=nxg%
6600 xinc=xr/nval%
6610 bw=vx/(nval%-xtext%)
6620 PROCgrid(minY,maxY,ymin,ymax,ylo,yhi,yr,vy,nyg%,yg%,ydiv%)
6630 xs=gx%/xr:ys=gy%/yr:            REM Scale units
6640 xsd=vx*di%/xr:ysd=vy*di%/yr:REM Scale units Drawfile
6650 sw%=lx%:sh%=ly%:                REM Window size
6660 ENDPROC
6670 :
6680 DEF PROCgrid(m,n,u,v,RETURN a,RETURN b,RETURN r,s,RETURN X%,RETURN Y%,W%)
6690 LOCAL f,i
6700 f=(v-u)/(n-m)
6710 IF W%=0 THEN
6720 nval%=FNint(v-u)
6730 X%=nval%
6740 I%=0
6750 WHILE g%(X%,I%)>s*2.5*f:I%+=1:ENDWHILE:X%=g%(X%,I%)
6760 i=(v-u)/X%:I%=0
6770 WHILE u+I%*i+i<=m:I%+=1:ENDWHILE:a=u+I%*i
6780 I%=-1
6790 WHILE v-I%*i-i>n:I%+=1:ENDWHILE:b=v-I%*i
6800 r=b-a
6810 X%=r/i
6820 ELSE a=u:b=v:r=b-a:IF bar% nval%=W%-1:X%=W% ELSE nval%=W%-1:X%=W%-1
6830 ENDIF
6840 Y%=FNint(r)*10/X%
6850 IF Y%>9 Y%=Y%/10
6860 i=s/X%*10
6870 IF i<=1 Y%=1 ELSE I%=0:WHILE g%(Y%,I%)>i:I%+=1:ENDWHILE:Y%=g%(Y%,I%)*X%
6880 ENDPROC
6890 :
6900 DEFFNint(n)
6910 LOCALi,Z%
6920 i=LOG(n)
6930 Z%=10^(i-INT(i))+0.99999999
6940 IF Z%>=10 =1 ELSE =Z%
6950 :
6960 DEF PROCinitfonts
6970 Maxfont=100
6980 afsize=10
6990 sfsize=8
7000 tfsize=12
7010 DIM font%(3,3),fonts(Maxfont),fontbuf Maxfont*32,axmf 28+24*Maxfont,timf 28+24*Maxfont,scmf 28+24*Maxfont,afi 12,tfi 12,sfi 12
7020 $axmf="Axis Font" :axmf!12=&0A070207:axmf!20=44:axmf!24=0
7030 $timf="Title Font":timf!12=&0A070207:timf!20=44:timf!24=0
7040 $scmf="Scale Font":scmf!12=&0A070207:scmf!20=44:scmf!24=0
7050 nfonts=0:F%=0:a%=axmf+28:s%=scmf+28:t%=timf+28:W%=0:p%=fontbuf
7060 axisfont=0
7070 titlefont=0
7080 SYS"Font_ListFonts",,p%,F%,-1 TO ,,F%
7090 WHILE F%>-1
7100 fonts(F%-1)=p%:nfonts+=1:L%=LEN($p%)+1:IF L%>W% W%=L%
7110 !a%=0:a%!4=0:a%!8=&07000121:a%!12=p%:a%!16=-1:a%!20=L%:a%+=24
7120 !s%=0:s%!4=0:s%!8=&07000121:s%!12=p%:s%!16=-1:s%!20=L%:s%+=24
7130 !t%=0:t%!4=0:t%!8=&07000121:t%!12=p%:t%!16=-1:t%!20=L%:t%+=24
7140 IF RIGHT$($p%,6)="Medium" axisfont=F%-1
7150 IF RIGHT$($p%,4)="Bold" titlefont=F%-1
7160 p%+=L%
7170 SYS"Font_ListFonts",,p%,F%,-1 TO ,,F%
7180 ENDWHILE
7190 axmf!16=12+W%*16
7200 timf!16=12+W%*16
7210 scmf!16=12+W%*16
7220 a%!-24=a%!-24 OR &80
7230 s%!-24=s%!-24 OR &80
7240 t%!-24=t%!-24 OR &80
7250 scalefont=axisfont
7260 PROCWimpTick(axmf,axisfont)
7270 PROCWimpTick(scmf,scalefont)
7280 PROCWimpTick(timf,titlefont)
7290 ENDPROC
7300 :
7310 DEF PROCnewfont(mf,xf%,nf%)
7320 PROCWimpTick(mf,xf%)
7330 PROCWimpTick(mf,nf%)
7340 PROClf
7350 IF mf=axmf axisfont=nf% ELSEIF mf=scmf scalefont=nf% ELSE titlefont=nf%
7360 PROCgf
7370 PROCforce
7380 ENDPROC
```

Listing 3

```
10 REM >WimpLib (Graph3)
20 REM by Mike Curnow
30 REM For Arc only
40 REM (c) BAU Dec '91   .
50 :
60 DEF PROCWimpInit(n$,S%)
70 SYS"Wimp_Initialise",200,&4B534154,n$+CHR$0
80 DIM b% S%,mb% &400
90 menufree%=mb%
100 menuend%=mb%+&400
110 taskn$=n$
120 ENDPROC
130 :
140 DEF FNIconTask(n$):LOCAL S%,T%
150 S%=OPENIN"<Obey$Dir>.!Sprites"
160 T%=EXT#S%+16
170 CLOSE#S%
180 IF S%=0 =0
190 DIM S% T%
200 !S%=T%
210 S%!8=16
220 SYS "OS_SpriteOp",&109,S%
230 SYS "OS_SpriteOp",&10A,S%,"<Obey$Dir>.!Sprites"
240 !b%=-1
250 b%!4=0
260 b%!8=0
270 b%!12=S%!32*16+4
280 b%!16=S%!36*4+4
290 b%!20=&2102
300 DIM b%!24 (LENn$+1)
310 $(b%!24)=n$
320 b%!28=S%
330 b%!32=LENn$+1
340 SYS"Wimp_CreateIcon",,b% TO T%
350 =T%
360 :
370 DEF PROCWimpClM
380 SYS"Wimp_CreateMenu",,TRUE
390 ENDPROC
400 :
410 DEF FNWimpMenu(handle%,menu$,menutitle$)
420 IF menufree%+28 > menuend% THEN ERROR 0,"Menu area full"
430 LOCAL h%,i%,m%,w%,y%,item$
440 h%=4
450 menuptr%=menufree%
460 $menuptr%=menutitle$
470 menuptr%?12=7
480 menuptr%?13=2
490 menuptr%?14=7
500 menuptr%?15=10
510 menuptr%!20=44
520 menuptr%!24=0
530 menuptr%+=28
540 w%=LENmenutitle$-2
550 REPEAT
560 item$=FNmpar(",")
570 PROCmenuitem(item$)
580 h%+=44
590 UNTIL item$=""
600 m%=menufree%
610 m%!16=(w%*8+6)*2:h%-=44
620 IF handle%>=0 THEN
630 IF handle%=0 THEN y%=h%+92 ELSE y%=b%!4+h%
640 SYS"Wimp_CreateMenu",,m%,!b%-64,y%
650 menutop%=m%
660 menufree%=mb%
670 ELSE menufree%=menuptr%
680 ENDIF
690 =m%
700 :
710 DEF PROCmenuitem(text$)
720 IF text$="" THEN menuptr%!-24=(menuptr%!-24) OR &80:ENDPROC
730 IF menuptr%+24>menuend% THEN ERROR 0,"Menu area full"
740 LOCAL i%,i1%,flg%,subptr%,L%,I%
750 flg%=&00
760 i%=INSTR(text$,">")
770 IF RIGHT$(text$,1)="#" THEN text$=LEFT$(text$,LENtext$-1):flg%+=&02:h%+=26
780 IF i%>0 THEN subptr%=EVALMID$(text$,i%+1):text$=LEFT$(text$,i%-1) ELSE subptr%=-1
790 menuptr%!0=flg%
800 menuptr%!4=subptr%
810 menuptr%!8=&07000021
820 IF LEFT$(text$,1)="$"THEN
830 !menuptr%+=&04
840 menuptr%!8+=&108
850 i%=INSTR(text$,"(")
860 IF i%>0 THEN L%=VALMID$(text$,i%+1):text$=LEFT$(text$,i%-1) ELSE L%=12
870 menuptr%!12=EVALMID$(text$,2)
880 menuptr%!16=-1:menuptr%!20=L%
890 text$=STRING$(L%," ")
900 ELSE
910 IF LEFT$(text$,1)="!" THEN
920 text$=RIGHT$(text$,LENtext$-1)
930 !menuptr%+=&08
940 ENDIF
950 IF LENtext$<=12THEN
960 $(menuptr%+12)=text$
970 ELSE I%=FNworkspace(LENtext$+1):$I%=text$
980 menuptr%!12=I%
990 menuptr%!16=-1
1000 menuptr%!20=LENtext$+1
1010 menuptr%!8=menuptr%!8 OR &100
1020 ENDIF
1030 IF LEN text$>w% THEN w%=LENtext$
1040 ENDIF
1050 menuptr%+=24
1060 ENDPROC
1070 :
1080 DEF FNworkspace(L%)
1090 DIM L% L%
1100 = L%
1110 :
1120 DEF FNmpar(sep$)
1130 i1%=i%+1
1140 i%=INSTR(menu$+sep$,sep$,i1%)
1150 =MID$(menu$,i1%,i%-i1%)
1160 :
1170 DEF PROCWimpTick(b%,n%)
1180 b%!(28+24*n%)=b%!(28+24*n%) EOR &01
1190 ENDPROC
1200 :
1210 DEF PROCWimpSelect(menus%,RETURN m$,RETURN but%)
1220 SYS"Wimp_GetPointerInfo",,b%+64
1230 but%=b%!72
1240 SYS"Wimp_DecodeMenu",,menutop%,menus%,STRING$(200," ")TO,,,m$
1250 IF m$="" THEN ENDPROC
1260 IF m$="Quit" PROCWimpEnd:END
1270 ENDPROC
1280 :
1290 DEF FNWimpErr(t$):LOCAL K%
1300 !b%=0
1310 $(b%+4)=t$+CHR$0
1320 SYS"Wimp_ReportError",b%,3,taskn$ TO ,K%
1330 =K%
1340 :
1350 DEF PROCWimpStop
1360 ON ERROR OFF
1370 SYS"Wimp_DragBox",,-1
1380 !b%=ERR
1390 IF ERR>52 $(b%+4)=REPORT$+CHR$0 ELSE $(b%+4)=REPORT$+" at line "+STR$ERL+CHR$0
1400 SYS"Wimp_ReportError",b%,1,taskn$
1410 PROCWimpEnd
1420 END
1430 :
1440 DEF PROCOpenWin(h%,xl%,yl%,xh%,yh%,xo%,yo%,f%)
1450 !b%=h%
1460 b%!4=xl%
1470 b%!8=yl%
1480 b%!12=xh%
1490 b%!16=yh%
1500 b%!20=xo%
1510 b%!24=yo%
1520 b%!28=f%
1530 SYS"Wimp_OpenWindow",,b%
1540 ENDPROC
1550 :
1560 DEF PROCCloseWin(w%):!b%=w%
1570 SYS"Wimp_CloseWindow",,b%
1580 ENDPROC
1590 :
1600 DEF PROCDelWin(w%)
1610 !b%=w%
1620 SYS"Wimp_DeleteWindow",,b%
1630 ENDPROC
1640 :
1650 DEF PROCWimpSE(w%,A%,B%,C%,D%)
1660 !b%=A%
1670 b%!4=B%
1680 b%!8=C%
1690 b%!12=D%
1700 SYS"Wimp_SetExtent",w%,b%
1710 ENDPROC
1720 :
1730 DEF PROCWimpNewTitle(w%)
1740 !b%=w%:SYS"Wimp_GetWindowOutline",,b%
1750 SYS"Wimp_ForceRedraw",-1,b%!4,b%!16-44,b%!12,b%!16
1760 ENDPROC
1770 :
1780 DEF PROCWimpOT(T$)
1790 SYS"Wimp_OpenTemplate",,T$
1800 ENDPROC
1810 :
1820 DEF PROCWimpCT
1830 SYS"Wimp_CloseTemplate"
1840 ENDPROC
1850 :
1860 DEF FNWimpLT(I%,N%,T$)
1870 SYS"Wimp_LoadTemplate",,b%,I%,N%,TRUE,T$,0 TO ,,N%,,,,I%
1880 IF I%=0 PROCWimpCT:!b%=0:$(b%+4)="Template "+T$+" not found"+CHR$0:SYS"Wimp_ReportError",b%,1,taskn$:PROCWimpEnd:END
1890 =N%
1900 :
1910 DEF FNWimpCW(b%)
1920 LOCAL H%
1930 SYS"Wimp_CreateWindow",,b% TO H%:=H%
1940 :
1950 DEF PROCWimpSSave
1960 LOCAL A%,B%,C%,D%
1970 !b%=SaveAs%
1980 b%!4=0
1990 SYS"Wimp_GetIconState",,b%
2000 b%!32=SaveAs%
2010 SYS "Wimp_GetWindowState",,b%+32
2020 A%=b%!36+b%!8
2030 B%=b%!48+b%!12
2040 C%=b%!36+b%!16
```

```
2050 D%=b%!48+b%!20
2060 b%!8=A%
2070 b%!12=B%
2080 b%!16=C%
2090 b%!20=D%
2100 b%!24=0
2110 b%!28=0
2120 b%!32=&7FFFFFF
2130 b%!36=&7FFFFFF
2140 b%!4=5
2150 SYS"Wimp_DragBox",,b%
2160 ENDPROC
2170 :
2180 DEF PROCWimpDoSave(fn$,T%)
2190 SYS"Wimp_GetPointerInfo",,b%
2200 b%!20=128
2210 b%!32=0
2220 b%!36=1
2230 b%!40=b%!12
2240 b%!44=b%!16
2250 b%!48=!b%
2260 b%!52=b%!4
2270 b%!56=0
2280 b%!60=T%
2290 $(b%+64)=fn$+CHR$0
2300 SYS"Wimp_SendMessage",17,b%+20,b%!
40,b%!44
2310 ENDPROC
2320 :
2330 DEF PROCWimpAckSave
2340 b%!16=3
2350 SYS"Wimp_SendMessage",17,b%,b%!20,
b%!24
2360 ENDPROC
2370 :
2380 DEF PROCHourOn
2390 SYS"Hourglass_On"
2400 ENDPROC
2410 :
2420 DEF PROCHourSmash
2430 SYS"Hourglass_Smash"
2440 ENDPROC
2450 :
2460 DEF FNGetStr(n%)
2470 LOCALn$
2480 IF ?n%<32 =n$
2490 REPEAT
2500 n$+=CHR$(?n%)
2510 n%+=1
2520 UNTIL ?n%<32:=n$
2530 :
2540 DEF PROCPutStr(n$,n%)
2550 n$+=CHR$0
2560 LOCAL I%
2570 FOR I%=1 TO LEN(n$)
2580 ?n%=ASC(MID$(n$,I%))
2590 n%+=1
2600 NEXT
2610 ENDPROC
2620 :
2630 DEF FNLeaf(n$)
2640 LOCALi%
2650 i%=LEN(n$)
2660 WHILE i%>0 AND MID$(n$,i%,1)<>".":
i%-=1
2670 ENDWHILE
2680 =MID$(n$,i%+1)
```

Pieces of Eight

Listing 1

```
10 REM >KiddieArt (Po81)
20 REM Original by John King
30 REM Rewritten by Dave Lawrence
40 REM For BBC B/B+/M/C/E
50 REM (c) BAU January 1987 & Decembe
r 1991
60 :
70 max=256
80 :
90 MODE 2
100 himem=HIMEM
110 HIMEM=HIMEM-4*max
120 array=HIMEM
130 VDU 23,1,0;0;0;0;
140 PROCinit
150 PROCedit
160 *FX 4,0
170 *FX 229,0
180 *FX 225,1
190 END
200 :
210 DEF PROCinit
220 DIM shape$(1)
230 shape$(0)="square"
240 shape$(1)="triangle"
250 *KEY10|MOLD|MRUN|M
260 col=0
270 size=0
280 PROCnextcol
290 *FX 4,1
300 *FX 229,1
310 *FX 225,140
320 *FX 226,140
330 shape=-1
340 in$=" SsTt"+CHR$142+" "+CHR$143+"
Cc>.<,LlRrDdUd"
350 FOR char=136 TO 139
360 in$=in$+CHR$char+" "
370 NEXT
380 ptr=array-4
390 REPEAT
400 ptr=ptr+4
410 UNTIL ?ptr>16 OR !ptr=-1 OR ptr=hi
mem
420 IF !ptr=-1 AND ptr<>array PROCredr
aw ELSE ptr=array:!ptr=-1
430 ENDPROC
440 :
450 DEF PROCedit
460 GCOL 4,8
470 REPEAT
480 *FX 21,0
490 REPEAT
500 get=GET
510 key=INSTR(in$,CHR$get)DIV2
520 UNTIL key<>0 OR get=27
530 IF key>0 AND key<3 PROCnewshape
540 IF key=3 PROCload
550 IF key=4 PROCsave
560 IF shape<0 key=0
570 IF key=5 PROCnextcol
580 IF key=6 AND size<255 PROCsize(+1)
590 IF key=7 AND size>1 PROCsize(-1)
600 IF key>7 PROCmove((key-8)MOD4)
610 UNTIL get=27
620 IF shape>-1 PROCstore
630 ENDPROC
640 :
650 DEF PROCnextcol
660 col=(col+1) MOD 8
670 FOR i%=8 TO 15
680 VDU 19,i%,col;0;
690 NEXT
700 ENDPROC
710 :
720 DEF PROCstore
730 IF EVAL("FN"+shape$)
740 IF ptr=himem ENDPROC
750 ?ptr=col OR (8*shape):ptr?1=x+47:p
tr?2=y+63:ptr?3=size
760 ptr=ptr+4:!ptr=-1
770 ENDPROC
780 :
790 DEF PROCnewshape
800 IF shape>-1 PROCstore
810 x=80:y=64:size=0:shape=key-1:shape
$=shape$(shape)
820 IF col=POINT(8*x,8*y) PROCnextcol
830 PLOT 69,8*x,8*y
840 PLOT 65,0,4
850 FOR i=1 TO 10
860 PROCsize(+1)
870 NEXT
880 ENDPROC
890 :
900 DEF PROCsize(add)
910 IF add>0 size=size+add
920 IF EVAL("FN"+shape$+"bit")
930 IF add<0 size=size+add
940 ENDPROC
950 :
960 DEF PROCmove(dir)
970 x=x+(dir=0 AND x>-47)-(dir=1 AND x
<208)
980 y=y+(dir=2 AND y>-63)-(dir=3 AND y
<192)
990 IF EVAL("FNmove"+shape$)
1000 ENDPROC
1010 :
1020 DEF FNsquare
1030 GCOL 0,128+col
1040 VDU 24
1050 PRINTFNs(8*(x-size));FNs(8*(y-size
));FNb(8*(x+size));FNb(8*(y+size)+4);
1060 VDU 16,26
1070 =0
1080 :
1090 DEF FNs(v)
1100 IF v<0 v=0
1110 VDU v;
1120 =""
1130 :
1140 DEF FNb(v)
1150 IF v>65535 v=65536
1160 VDU v;
1170 =""
1180 :
1190 VDU 24,8*(x-size);8*(y-size);8*(x+
size);8*(y+size)+4;16,26
1200 GCOL 4,8
1210 =0
1220 :
1230 DEF FNsquarebit
1240 MOVE 8*(x-size),8*(y-size)
1250 PLOT 9,16*size,0
1260 PLOT 9,0,16*size+4
1270 PLOT 9,-16*size,0
1280 PLOT 9,0,-16*size-4
1290 PLOT 0,8,4
1300 PLOT 1,16*(size-1),0
1310 PLOT 0,0,16*size-4
1320 PLOT 1,-16*(size-1),0
1330 =0
1340 :
1350 DEF FNmovesquare
1360 IF dir=0 PROClandr(-size,size+1)
1370 IF dir=1 PROClandr(-size-1,size)
1380 IF dir=2 PROCtandb(-size,size+1)
1390 IF dir=3 PROCtandb(-size-1,size)
1400 =0
1410 :
1420 DEF PROClandr(v1,v2)
1430 MOVE 8*(x+v1),8*(y-size)
1440 PLOT 1,0,16*size+4
1450 MOVE 8*(x+v2),8*(y-size)
1460 PLOT 1,0,16*size+4
1470 ENDPROC
1480 :
1490 DEF PROCtandb(h1,h2)
1500 MOVE 8*(x-size),8*(y+h1)
1510 PLOT 1,16*size,0
1520 PLOT 0,0,4
1530 PLOT 1,-16*size,0
1540 MOVE 8*(x-size),8*(y+h2)
1550 PLOT 1,16*size,0
1560 PLOT 0,0,4
1570 PLOT 1,-16*size,0
1580 ENDPROC
1590 :
1600 DEF FNtriangle
1610 GCOL 0,col
1620 MOVE 8*(x-2*size),8*(y-size)
1630 PLOT 0,16*size*2,0
1640 PLOT 81,-16*size,16*size+4
1650 GCOL 4,8
1660 =0
1670 :
1680 DEF FNtrianglebit
1690 MOVE 8*(x-2*size),8*(y-size)
1700 PLOT 9,16*size*2,0
1710 PLOT 9,-16*size,16*size+4
1720 PLOT 9,-16*size,-16*size-4
1730 PLOT 0,8,4
1740 PLOT 1,16*(2*size-1),0
1750 PLOT 69,8*x,8*(y+size)
1760 =0
1770 :
1780 DEF FNmovetriangle
1790 IF dir=0 PROCslope(-2*size)
1800 IF dir=1 PROCslope(-2*size-1)
1810 IF dir=2 PROCbase(-size)
1820 IF dir=3 PROCbase(-size-1)
1830 =0
1840 :
1850 DEF PROCslope(off)
1860 MOVE 8*(x+off),8*(y-size)
1870 PLOT 1,16*size+4,16*size+4
1880 PLOT 0,8,0
1890 PLOT 1,16*size,-16*size-4
1900 ENDPROC
1910 :
1920 DEF PROCbase(off)
1930 MOVE 8*(x-2*size),8*(y+off)
1940 PLOT 1,16*size*2,0
1950 PLOT 0,0,4
1960 PLOT 1,-16*size*2,0
1970 PLOT 0,0,4
1980 PLOT 1,16*size+4,16*size+4
1990 PLOT 0,4,-8
2000 PLOT 1,16*size-4,-16*size+4
2010 ENDPROC
2020 :
2030 DEF PROCredraw
2040 ptr=array
2050 REPEAT
2060 col=?ptr AND 7:x=ptr?1-47:y=ptr?2-
63:size=ptr?3
2070 IF EVAL("FN"+shape$(-(?ptr>7)))
2080 ptr=ptr+4
2090 UNTIL !ptr=-1
2100 ENDPROC
2110 :
2120 DEF PROCsave
2130 IF shape<0 ENDPROC
2140 PROCstore
2150 PRINTTAB(4,1);"Save Picture"
2160 INPUT'"Filename:"file$
2170 IF file$<>"" OSCLI"Save "+file$+"
"+STR$~array+" "+STR$~(ptr+4)+" 0 0"
2180 CLS
2190 PROCredraw
2200 ENDPROC
2210 :
2220 DEF PROCload
2230 PRINTTAB(4,1);"Load Picture"
2240 INPUT'"Filename:"file$
2250 IF file$<>"" OSCLI"Load "+file$+"
"+STR$~array
2260 CLS
2270 PROCredraw
2280 ENDPROC
```

Listing 2

```
10 REM >Theme1 (PO82) - Loader for Mu
sic Editor
20 REM By David Lawrence
30 REM For BBC B/B+/M/C
40 REM (c) BAU April 1987 & December
1991
50 :
60 MODE 7
70 PROCcode
80 PROCchecksum
90 PROCvdus
100 PROCenvs
110 CHAIN "Theme2"
120 :
130 DEF PROCcode
140 addr=&70
150 FOR pass%=0 TO 2 STEP 2
160 P%=&9C0
170 [OPT pass%
180 .findend
190 STA addr+1
200 LDY #0
210 STY addr
220 .loop
230 DEY
240 DEY
250 CPY #&FE
260 BNE notlo
270 DEC addr+1
280 .notlo
290 LDA (addr),Y
300 BNE got
310 INY
320 LDA (addr),Y
330 BNE got2
340 DEY
350 JMP loop
360 .got2
370 DEY
380 .got
390 STY addr
400 RTS
410 ]
420 NEXT pass%
430 ENDPROC
440 :
450 DEF PROCchecksum
460 T%=0
470 FOR I%=&9C0 TO P%-1
480 T%=T%+?I%
490 NEXT
500 IF T%<>3992 PROCerror("code")
510 T%=0
520 FOR I%=1 TO 256
530 READ V%
540 T%=T%+V%
550 NEXT
560 IF T%<>13632 PROCerror("vdus")
570 T%=0
580 FOR I%=1 TO 208
590 READ V%
600 T%=T%+V%
610 NEXT
620 IF T%<>2581 PROCerror("envs")
630 RESTORE
640 ENDPROC
650 :
660 DEF PROCerror(a$)
670 VDU 7
680 PRINT "Checksum error in ";a$;"."
690 END
700 :
710 DEF PROCvdus
720 FOR I%=128 TO 159
730 VDU 23,I%
740 FOR J%=1 TO 8
750 READ V%
760 VDU V%
770 NEXT
780 NEXT
790 ENDPROC
800 :
810 DEF PROCenvs
820 M%=&A00
830 FOR E%=0 TO 15
840 ?(M%+E%*16)=E%+1
850 FOR I%=1 TO 13
860 READ V%
870 ?(M%+E%*16+I%)=V%
880 NEXT
890 X%=E%*16 : Y%=&A : A%=8 : CALL&FFF
1
900 NEXT
910 ENDPROC
920 :
930 REM VDU data
940 :
950 DATA 0,0,60,102,66,102,60,0
960 DATA 12,12,124,204,204,204,120,0
970 DATA 12,12,124,252,252,252,120,0
980 DATA 14,15,125,252,252,252,120,0
990 DATA 0,12,12,12,12,12,12,12
1000 DATA 0,14,15,13,12,12,12,12
1010 DATA 0,14,15,13,14,15,13,12
1020 DATA 0,0,40,124,40,40,124,40
1030 DATA 32,32,44,50,34,44,48,0
1040 DATA 0,16,16,28,20,28,4,4
1050 DATA 0,0,0,0,0,192,192,0
1060 DATA 1,3,2,2,3,3,6,14
1070 DATA 128,192,64,192,128,0,0,0
1080 DATA 26,26,49,97,99,199,201,216
1090 DATA 0,0,0,0,192,240,24,152
1100 DATA 204,68,96,56,15,0,6,7
1110 DATA 152,152,176,224,128,128,128,1
28
1120 DATA 127,128,128,220,124,8,0,0
1130 DATA 192,102,38,16,16,16,22,22
1140 DATA 0,0,0,0,0,0,1,2
1150 DATA 16,16,32,32,64,128,0,0
1160 DATA 0,49,31,2,4,4,8,8
1170 DATA 8,4,6,6,6,12,24,16
1180 DATA 8,4,14,17,32,32,16,8
1190 DATA 0,0,0,126,126,255,0,0
1200 DATA 255,126,126,0,0,0,0,0
1210 DATA 0,30,51,51,51,62,48,48
1220 DATA 0,30,63,63,63,62,48,48
1230 DATA 0,30,63,63,62,52,60,56
1240 DATA 48,48,48,48,48,48,48,0
1250 DATA 48,48,48,48,52,60,56,0
```

```
1260 DATA 52,60,56,52,60,56,0,0
1270 :
1280 REM Envelope data
1290 :
1300 DATA 1,0,0,0,0,0,0,127,-1,-1,-1,120,80
1310 DATA 1,0,0,0,0,0,0,90,-1,-1,-1,90,50
1320 DATA 1,0,0,0,0,0,0,40,-1,-1,-1,40,5
1330 DATA 1,0,0,0,0,0,0,127,0,0,-127,127,0
1340 DATA 1,0,0,0,0,0,0,90,0,0,-90,90,0
1350 DATA 1,0,0,0,0,0,0,40,0,0,-20,40,0
1360 DATA 1,0,0,0,1,1,1,126,0,0,-3,126,126
1370 DATA 1,0,0,0,1,1,1,80,0,0,-3,80,80
1380 DATA 5,1,-1,0,1,1,1,126,0,0,-16,126,126
1390 DATA 3,1,-1,0,1,1,1,126,0,0,-16,126,126
1400 DATA 1,0,0,0,1,1,1,126,-8,-3,-3,126,60
1410 :
1420 REM Put your own envelopes here
1430 :
1440 DATA 1,0,0,0,0,0,0,0,0,0,0,0,0
1450 DATA 1,0,0,0,0,0,0,0,0,0,0,0,0
1460 DATA 1,0,0,0,0,0,0,0,0,0,0,0,0
1470 DATA 1,0,0,0,0,0,0,0,0,0,0,0,0
1480 DATA 1,0,0,0,0,0,0,0,0,0,0,0,0
```

Listing 3

```
10 REM >Theme2 (Po83) - The Music Editor
20 REM By David Lawrence
30 REM For BBC B/B+/M/C
40 REM (c) BAU April 1987 & December 1991
50 :
60 ON ERROR GOTO 180
70 *TV 0 1
80 MODE 4 : HIMEM=&4C00
90 PROCcheck
100 PROCinit
110 PROCwindows
120 PROCscrn
130 PROCedit
140 MODE 4
150 PROCstars
160 END
170 :
180 PROCstars
190 VDU 3
200 PROCflash(1)
210 REPORT : PRINT " at line ";ERL
220 END
230 :
240 DEF PROCcheck
250 PROCflash(0)
260 T%=0
270 FOR I%=1 TO 97
280 READ V%
290 T%=T%+V%
300 NEXT
310 IF T%=9899 RESTORE : ENDPROC
320 PRINT "Error in data." : VDU7
330 PROCstars
340 END
350 :
360 DEF PROCstars
370 *FX 4
380 *FX 12 3
390 *FX 225 1
400 *FX 200 0
410 ENDPROC
420 :
430 DEF PROCinit
440 DIM c%(3),ch$(5),P%(29),p%(3)
450 DIM d%(3),a%(29),ac%(3,2),m%(3)
460 DIM up$(5),n%(2),E%(3)
470 c1%=&4C00:c2%=&5000:c3%=&5400
480 c%(1)=c1%:c%(2)=c2%:c%(3)=c3%
490 notes%=512:mem%=2*notes%
500 pgs%=notes%/8-1:S%=2:N%=1:ss%=-1
510 nn%=-1:P%=0:pp%=-1:ln2=LN2
520 nkey$="":rkey$="":T%=1:end%=FALSE
530 *FX 4 1
540 *FX 12 3
550 *FX 225 140
560 *FX 226 150
570 *FX 200 1
580 FOR I%=0 TO mem%-4 STEP 4
590 I%!c1%=0:I%!c2%=0:I%!c3%=0
600 NEXT
610 FOR I%=1 TO 3:?(c%(I%))=15:?(c%(I%)+1)=8
620 n%(I%-1)=1:E%(I%)=1:NEXT
630 FOR I%=0 TO 5:READ ch1%,ch2%
640 ch$(I%)=CHR$ch1%+CHR$8+CHR$10+CHR$ch2%
650 NEXT
660 FOR I%=0 TO 5:READ ch1%,ch2%
670 up$(I%)=CHR$ch1%+CHR$8+CHR$10+CHR$ch2%+CHR$11
680 NEXT
690 FOR I%=0 TO 3:FOR J%=0 TO 2
700 READ ac%(I%,J%):NEXT:NEXT
710 FOR I%=0 TO 5
720 nkey$=nkey$+CHR$(140+I%)
730 rkey$=rkey$+CHR$(150+I%)
740 NEXT
750 PROCflash(0)
760 PRINTTAB(12);FNdouble("The Music Editor")
770 PRINTTAB(12,2);STRING$(16,"~")
780 PRINT'FNdouble("Please enter the key signature (eg: 1S,2F,<ret>) :");CHR$10;
790 PROCflash(1)
800 REPEAT n$=GET$
810 UNTILn$=CHR$13OR(n$>"0"ANDn$<"6")
820 key$=FNgetkey
830 nk%=VAL(n$):PROCflash(0):CLS
840 ENDPROC
850 :
860 DEF FNgetkey
870 IF n$=CHR$13 THEN ="N"
880 PRINT CHR$11;FNdouble(n$);CHR$10;
890 REPEAT key$=GET$
900 UNTIL key$="S"ORkey$="F"
910 PRINT CHR$11;FNdouble(key$)
920 =key$
930 :
940 DEF FNdouble(s$)
950 ?&80=128:X%=&80:Y%=0:A%=&A
960 CALL &FFF1
970 FOR i%=1 TO LEN(s$)
980 ?&70=ASC(MID$(s$,i%,1))
990 X%=&70:CALL &FFF1
1000 IF POS=39 PRINT'
1010 VDU 23,128,?&71,!&71;!&72;!&73;?&74,128,10,8
1020 VDU 23,128,?&75,!&75;!&76;!&77;?&78,128,11
1030 NEXT
1040 VDU 23,128,!&81;!&83;!&85;!&87;
1050 =CHR$0
1060 :
1070 DEF PROCflash(s%)
1080 VDU 23,0,10,255-159*s%;0;0;0;0;
1090 ENDPROC
1100 :
1110 DEF PROCwindows
1120 VDU 28,32,12,39,0,11
1130 PRINTFNdouble("The")''FNdouble("Music")''FNdouble("Editor")''
1140 PRINT"By DavidLawrence"'"(c)AU 87"
1150 COLOUR 129:COLOUR 0:GCOL 0,0
1160 VDU 28,0,0,30,0,12
1170 VDU 28,32,12,39,12,12
1180 VDU 28,32,31,39,14,12,26
1190 PRINTTAB(32,12);"Tempo: 1"
1200 ENDPROC
1210 :
1220 DEF PROCscrn
1230 RESTORE 5520
1240 FOR I%=1 TO 29:READ P%(I%):NEXT
1250 VDU 28,0,31,30,2,12,26
1260 PRINTTAB(0,0);"Page: 0   V1:    V2:    V3:   "
1270 VDU 5
1280 FOR st%=0 TO 2:FOR I%=2 TO 12
1290 IF I%<>7 MOVE 0,st%*320+I%*20+10:PLOT 1,160,0
1300 NEXT
1310 MOVE 4,st%*320+250:VDU 139,140
1320 MOVE 4,st%*320+218:VDU 141,142
1330 MOVE 4,st%*320+186:VDU 143,144
1340 MOVE 4,st%*320+126:VDU 145,146
1350 MOVE 4,st%*320+94:VDU 147,148
1360 IF key$<>"N" PROCkeysig
1370 NEXT
1380 VDU 4:PROCalter(key$,nk%)
1390 FOR st%=0 TO 2
1400 PRINTFNnumb(st%):NEXT
1410 ENDPROC
1420 :
1430 DEF PROCalter(key$,nk%)
1440 FOR I%=1 TO 29:a%(I%)=1:NEXT
1450 IF key$="N" ENDPROC
1460 RESTORE 5580:a%=4
1470 IF key$="F" RESTORE 5590:a%=-4
1480 FOR I%=1 TO nk%:READ s%:REPEAT
1490 P%(s%)=P%(s%)+a%:a%(s%)=a%/4+1
1500 s%=s%+7
1510 UNTIL s%>29:NEXT
1520 ENDPROC
1530 :
1540 DEF PROCpage(p%)
1550 FOR st%=0 TO 2
1560 PROCstave(st%):NEXT
1570 PRINTTAB(6,0);P%;" ";
1580 ENDPROC
1590 :
1600 DEF PROCstave(st%)
1610 R%=(2-st%)*10+2
1620 VDU 28,5,R%+9,30,R%,12,26:GCOL0,0
1630 FOR I%=2 TO 12
1640 IF I%<>7 MOVE 160,st%*320+I%*20+10:PLOT 1,832,0
1650 NEXT
1660 FOR I%=0 TO 7
1670 A%=c%(st%+1)+16*p%+I%*2
1680 PROCnote(st%,I%+1,?A%,A%?1,0)
1690 NEXT:ENDPROC
1700 :
1710 DEF PROCkeysig
1720 RESTORE 5550
1730 IF key$="F" RESTORE 5560
1740 READ C%:X%=64
1750 FOR I%=1 TO nk%
1760 READ H%:MOVE X%,st%*320+H%:VDU C%
1770 READ H%:MOVE X%,st%*320+H%:VDU C%
1780 X%=X%+16:NEXT:ENDPROC
1790 :
1800 DEF FNnumb(c%)
1810 VDU 31,13+c%*7,0,32,32,32,8,8,8
1820 PRINT;n%(c%)
1830 =CHR$0
1840 :
1850 DEF PROCcurs(st%,no%)
1860 GCOL 3,1
1870 PROCl(1):PROCl(3):PROCl(15)
1880 PROCl(27):PROCl(29)
1890 ENDPROC
1900 :
1910 DEF PROCl(ln%)
1920 IF ln%>29 OR ln%<1 ENDPROC
1930 MOVE 100*no%+72,st%*320+ln%*10
1940 PLOT 1,78,0
1950 ENDPROC
1960 :
1970 DEF PROCsl(ln%)
1980 IF ln%>29 OR ln%<1 ENDPROC
1990 MOVE 100*no%+90,st%*320+ln%*10
2000 PLOT 1,48,0
2010 ENDPROC
2020 :
2030 DEF PROCnote(st%,no%,pi%,du%,co%)
2040 GCOL 0,co%:IF pi%=&FE PROCshowe(st%,no%,du%):ENDPROC
2050 IF pi%=0 AND du%=0 ENDPROC
2060 W%=pi% AND 31:V%=st%*320+16+10*W%
2070 H%=100*(no%+1):L%=LN(du%)/ln2
2080 IF pi%=0 PROCrest(st%,no%,L%):ENDPROC
2090 D%=0:IF LN(du%)/ln2<>L% D%=TRUE
2100 Z%=(pi%/32) AND 3:VDU 5
2110 IF W%<22 OR L%=5 MOVE H%,V%+32:PRINTch$(L%);:V%=2 ELSE MOVE H%,V%-8:PRINTup$(L%);:MOVE H%+36,V%:V%=-2
2120 IF D% VDU 138,8
2130 IF Z% VDU 8,8,134+Z%
2140 VDU 4
2150 IF W%=1 OR W%=15 OR W%=29 PROCsl(W%)
2160 IF W%<4 PROCsl(3)
2170 IF W%>26 PROCsl(27)
2180 IF co%=1 GCOL0,0:L%=(W%-1)OR1:PROCl(L%-V%):PROCl(L%):PROCl(L%+V%):PROCl(L%+2*V%)
2190 ENDPROC
2200 :
2210 DEF PROCrest(st%,no%,L%)
2220 VDU 5:V%=V%+192
2230 IF L%<3 FOR Q%=0 TO 2-L%:MOVE H%+Q%*4,V%+Q%*8+12:VDU 149:NEXT:VDU 4:PROCd:ENDPROC
2240 MOVE H%,V%:IF L%<>3 PLOT 0,0,20
2250 VDU 148+L%
2260 IF L%=3 MOVE H%,V%+32:VDU 150
2270 VDU 4:PROCd
2280 ENDPROC
2290 :
2300 DEF PROCd
2310 IF co%=1 GCOL0,0:PROCl(19):PROCl(21):PROCl(23)
2320 ENDPROC
2330 :
2340 DEF PROCshowe(st%,no%,num%)
2350 MOVE 100*(no%+1),st%*320+160
2360 VDU 5:PRINTCHR$(num%+64):VDU4
2370 IF co%=1 GCOL 0,0:PROCl(15)
2380 ENDPROC
2390 :
2400 DEF PROCgetvals
2410 ad%=c%(S%+1)+16*P%+N%*2-2
2420 pi%=?ad%:du%=ad%?1
2430 ENDPROC
2440 :
2450 DEF PROCedit
2460 PROCgetvals
2470 REPEAT
2480 PROCcurs(ss%,nn%)
2490 IF P%<>pp% PROCpage(P%) ELSE PROCnote(ss%,nn%,pi%,du%,0)
2500 PROCcurs(S%,N%):PROCgetvals
2510 PROCnote(S%,N%,pi%,du%,0)
2520 REPEAT:*FX21,0
2530 k$=GET$:ss%=S%:nn%=N%:pp%=P%
2540 sh%=INKEY-1:ct%=INKEY-2
2550 PROCdo
2560 UNTIL S%<>ss% OR N%<>nn% OR P%<>pp% OR end%
2570 UNTIL end%
2580 ENDPROC
2590 :
2600 DEF PROCdo
2610 IF k$=CHR$136 PROCleft:ENDPROC
2620 IF k$=CHR$137 PROCright:ENDPROC
2630 IF k$=CHR$139 PROCup:ENDPROC
2640 IF k$=CHR$138 PROCdown:ENDPROC
2650 IF INSTR(nkey$,k$) PROCgetnote:ENDPROC
2660 IF INSTR(rkey$,k$) PROCgetrest:ENDPROC
2670 IF k$=CHR$13 PROCnextone:ENDPROC
2680 IF INSTR("SFNO",k$) PROCaccident:ENDPROC
2690 IF k$=CHR$9 PROCplay:ENDPROC
2700 IF k$="." PROCdot:ENDPROC
2710 IF k$=CHR$127 PROCdelete:ENDPROC
2720 IF k$="I" PROCinsert:ENDPROC
2730 IF k$="@" PROCfile:ENDPROC
2740 IF k$>"0" AND k$<":" PROCtempo:ENDPROC
2750 IF k$=CHR$146 PROCenvel:ENDPROC
2760 IF k$="P" PROCdump
2770 ENDPROC
2780 :
2790 DEF PROCleft
2800 IF sh% AND P%>0 P%=P%-1
2810 IF ct% P%=0:N%=2
2820 N%=N%-1:IF N%=0 N%=8
2830 ENDPROC
2840 :
2850 DEF PROCright
2860 IF sh% AND P%<pgs% P%=P%+1
2870 IF ct% P%=pgs%:N%=8
2880 N%=N%+1:IF N%=9 N%=1
2890 ENDPROC
2900 :
2910 DEF PROCup
2920 IF sh% S%=(S%+1)MOD3:ENDPROC
2930 IF pi%=&FE PROCnewenv(1):ENDPROC
2940 IF (pi% AND 31)<29 AND pi%<>0 PROCnewnote(pi%+1,du%)
2950 ENDPROC
2960 :
2970 DEF PROCdown
2980 IF sh% S%=(S%+2)MOD3:ENDPROC
2990 IF pi%=&FE PROCnewenv(-1):ENDPROC
3000 IF (pi% AND 31)>1 PROCnewnote(pi%-1,du%)
3010 ENDPROC
3020 :
3030 DEF PROCnewenv(in%)
3040 PROCcurs(S%,N%)
3050 GCOL 0,1:PROCshowe(S%,N%,du%)
3060 du%=du%+in%:IF du%=0 du%=16
3070 IF du%=17 du%=1
3080 ad%?1=du%
3090 GCOL 0,0:PROCshowe(S%,N%,du%)
3100 PROCcurs(S%,N%)
3110 ENDPROC
3120 :
3130 DEF PROCgetnote
3140 np%=pi%
3150 IF pi%=0 OR pi%=&FE np%=15
3160 PROCnewnote(np%,2^(ASC(k$)-140))
3170 ENDPROC
3180 :
3190 DEF PROCgetrest
3200 PROCnewnote(0,2^(ASC(k$)-150))
3210 ENDPROC
3220 :
3230 DEF PROCnewnote(np%,nd%)
3240 PROCnote(S%,N%,pi%,du%,1)
3250 IF pi%=0 AND du%=0 n%(S%)=n%(S%)+1:PRINTFNnumb(S%)
3260 pi%=np%:du%=nd%
3270 PROCnote(S%,N%,pi%,du%,0)
3280 ?ad%=pi%:ad%?1=du%
3290 ENDPROC
3300 :
3310 DEF PROCnextone
3320 IF pi%=0 AND du%=0 PROCnewnote(15,8):ENDPROC
3330 N%=N%+1:IF N%=9 N%=1:P%=P%+1:IF P%=pgs% VDU7:P%=P%-1:N%=8:ENDPROC
3340 np%=pi%:nd%=du%:IF pi%=0 du%=0
3350 PROCsound(S%+1,pi%,du%)
3360 PROCgetvals
3370 IF pi%<>0 OR du%<>0 pi%=np%:du%=nd%:ENDPROC
3380 IF P%=pp% PROCnote(S%,N%,np%,nd%,0)
3390 ?ad%=np%:ad%?1=nd%
3400 n%(S%)=n%(S%)+1:PRINTFNnumb(S%)
3410 pi%=np%:du%=nd%
3420 ENDPROC
3430 :
3440 DEF PROCplay
3450 FOR I%=1 TO 3:p%(I%)=c%(I%)
3460 m%(I%)=FNfindend(I%-1):!m%(I%)=-1
3470 d%(I%)=TRUE:E%(I%)=1:NEXT
3480 REPEAT
3490 FOR I%=1 TO 3
3500 IF ADVAL(-5-I%)>0 AND d%(I%) PROCsound(I%,?p%(I%),?(p%(I%)+1))
3510 NEXT
3520 UNTIL d%(1)+d%(2)+d%(3)=0 OR INKEY-99
3530 IF INKEY-99 THEN *FX15
3540 FOR I%=1 TO 3:!m%(I%)=0:NEXT
3550 ENDPROC
3560 :
3570 DEF PROCsound(v%,p%,d%)
3580 IF p%<>0 V%=E%(v%) ELSE V%=0:IF d%=0 p%(v%)=p%(v%)+2:ENDPROC
3590 IF p%=&FF d%(I%)=FALSE:ENDPROC
3600 IF p%=&FE E%(v%)=d%:p%(v%)=p%(v%)+2:ENDPROC
3610 a%=(p%/32) AND 3:p%=p%AND31
3620 p%=P%(p%)+ac%(a%,a%(p%))
3630 SOUND v%,V%,p%,d%*T%
3640 p%(v%)=p%(v%)+2
3650 ENDPROC
3660 :
3670 DEF FNfindend(s%)
3680 A%=&50+s%*4:CALL &9C0
3690 =?&70+256*?&71+2
3700 :
3710 DEF PROCaccident
3720 IF du%=0 OR pi%=0 OR pi%=&FE ENDPROC
3730 np%=(pi% AND 31)
3740 IF k$="S" np%=np%+32
3750 IF k$="F" np%=np%+64
3760 IF k$="N" np%=np%+96
3770 PROCnewnote(np%,du%)
3780 ENDPROC
3790 :
3800 DEF PROCdot
```

```
3810 IF du%=0 OR pi%=&FE ENDPROC
3820 d=LN(du%)/ln2
3830 IF d=INT(d) nd%=du%*1.5 ELSE nd%=d
u%/1.5
3840 PROCnewnote(pi%,nd%)
3850 ENDPROC
3860 :
3870 DEF PROCdelete
3880 IF P%=0 AND N%=1 ENDPROC
3890 FOR I%=ad% TO FNfindend(S%) STEP 2
:!I%=I%!2:NEXT
3900 IF pi%<>0 OR du%<>0 n%(S%)=n%(S%)-
1:PRINTFNnumb(S%)
3910 PROCsortout
3920 ENDPROC
3930 :
3940 DEF PROCinsert
3950 IF P%=0 AND N%=1 ENDPROC
3960 IF P%=pgs% AND N%=8 ENDPROC
3970 FOR I%=FNfindend(S%)-2 TO ad% STEP
-2:!I%=I%!-2:NEXT
3980 ?ad%=0:ad%?1=0:PROCsortout
3990 ENDPROC
4000 :
4010 DEF PROCsortout
4020 p%=P%:PROCstave(S%)
4030 PROCcurs(S%,N%):PROCgetvals
4040 ENDPROC
4050 :
4060 DEF PROCfile
4070 VDU28,32,31,39,14
4080 PRINT" ";FNdouble("Filing")'''
4090 PRINT'"Please"'"select"'"option:"
4100 PRINT'"1) Save"'"2) Load"'"3) Fina
l4) Exit"'"5) Quit"
4110 PRINT'" ";FNdouble("Which?");CHR$1
0;
4120 PROCflash(1):*FX21,0
4130 REPEAT:k$=GET$
4140 UNTIL k$>"0" AND k$<"6"
4150 IF k$="1" PROCsave
4160 IF k$="2" PROCload
4170 IF k$="3" PROCfinal
4180 IF k$="4" VDU 12,26:PROCflash(0)
4190 IF k$="5" end%=TRUE
4200 ENDPROC
4210 :
4220 DEF PROCsave
4230 name$=FNname
4240 CLS:PRINTFNdouble("Writing.")
4250 ch%=OPENOUT(name$)
4260 PRINT#ch%,key$,nk%
4270 FOR I%=0 TO 2
4280 PRINT#ch%,n%(I%):NEXT
4290 FOR I%=c1% TO &5800
4300 BPUT#ch%,?I%
4310 NEXT:CLOSE#ch%
4320 VDU 12,26:ENDPROC
4330 :
4340 DEF FNname
4350 REPEAT:CLS
4360 PRINT"Enter a"'"filename"'">";
4370 INPUT""name$
4380 ch%=OPENIN(name$)
4390 l%=EXT#ch%:CLOSE#ch%:yn$="Y"
4400 IF l%>0 PRINT'"Replace ?";:REPEATy
n$=GET$:UNTILyn$="Y"ORyn$="N"
4410 UNTIL yn$="Y":PROCflash(0)
4420 =name$
4430 :
4440 DEF PROCload
4450 REPEAT
4460 CLS:PRINT"Enter"'"filename"'">";
4470 INPUT""name$
4480 ch%=OPENIN(name$)
4490 l%=EXT#ch%:CLOSE#ch%:ok%=TRUE
4500 IF l%=0 PRINT'"No such"'"file.":ok
%=FALSE
4510 IF l%<>&C18 AND ok% PRINT'"Not a"'
"Music"'"file.":ok%=FALSE
4520 IF NOT ok% PRINT'"<SPACE>";:q%=GET
4530 UNTIL ok%:PROCflash(0)
4540 CLS:PRINTFNdouble("Reading.")
4550 ch%=OPENIN(name$)
4560 INPUT#ch%,key$,nk%
4570 FOR I%=0 TO 2
4580 INPUT#ch%,n%(I%):NEXT
4590 FOR I%=c1% TO &5800
4600 ?I%=BGET#ch%
4610 NEXT:CLOSE#ch%
4620 P%=0:N%=1:S%=0:pp%=-1
4630 nn%=-1:ss%=-1
4640 CLS:PROCscrn:ENDPROC
4650 :
4660 DEF PROCfinal
4670 name$=FNname
4680 CLS:PRINTFNdouble("Writing.")
4690 ch%=OPENOUT(name$)
4700 BPUT#ch%,6:BPUT #ch%,0
4710 add%=6:FOR I%=0 TO 1
4720 J%=0:REPEAT
4730 p%=?(&4C00+I%*&400+J%)
4740 d%=?(&4C01+I%*&400+J%)
4750 IF p%<>0 OR d%<>0 add%=add%+2
4760 IF p%=254 add%=add%+12
4770 J%=J%+2:UNTILJ%=&400:add%=add%+16
4780 BPUT#ch%,add% MOD 256
4790 BPUT#ch%,add% DIV 256
4800 NEXT
4810 FOR I%=0 TO 2
4820 PRINT'FNdouble("Voice "+STR$(I%+1)
)
4830 PROCwrenv(1)
4840 FOR J%=0 TO &3FE STEP 2
4850 p%=?(&4C00+I%*&400+J%)
4860 d%=?(&4C01+I%*&400+J%)
4870 IF p%=&FE PROCwrenv(d%) ELSE PROCw
rnote
4880 NEXT
4890 BPUT#ch%,255:BPUT#ch%,255
4900 NEXT:CLOSE#ch%
4910 VDU 12,26:ENDPROC
4920 :
4930 DEF PROCwrenv(d%)
4940 BPUT #ch%,&FE
4950 FOR by%=1 TO 13
4960 BPUT #ch%,?(&9F0+d%*16+by%):NEXT
4970 p%=0:d%=0
4980 ENDPROC
4990 :
5000 DEF PROCwrnote
5010 a%=(p%/32)AND3:p%=p%AND31
5020 p%=P%(p%)+ac%(a%,a%(p%))
5030 IF p%<>0 OR d%<>0 BPUT #ch%,p%:BPU
T #ch%,d%
5040 ENDPROC
5050 :
5060 DEF PROCtempo
5070 T%=VAL(k$):VDU 31,39,12,ASC(k$)
5080 ENDPROC
5090 :
5100 DEF PROCenvel
5110 PROCnote(S%,N%,pi%,du%,1)
5120 IF pi%=0 AND du%=0 n%(S%)=n%(S%)+1
:PRINTFNnumb(S%)
5130 pi%=&FE:du%=1:GCOL0,0
5140 PROCshowe(S%,N%,du%)
5150 ?ad%=pi%:ad%?1=du%
5160 ENDPROC
5170 :
5180 DEF PROCdump
5190 VDU 28,32,31,39,14
5200 PRINTFNdouble("Printer")''FNdouble
("Dump")
5210 PRINT''"Sure ?";:*FX 21,0
5220 PROCflash(1)
5230 REPEAT:yn$=GET$
5240 UNTIL yn$="Y" OR yn$="N"
5250 IF yn$="N" VDU 12,26:PROCflash(0):
ENDPROC
5260 LOCAL X%,Y%,Z%,A%,B%,C%
5270 CLS:PRINTFNdouble("Dump key")'FNdo
uble("sig ?");CHR$10;
5280 REPEAT:ks$=GET$
5290 UNTIL ks$="Y" OR ks$="N"
5300 IF ks$="Y" C%=0 ELSE C%=160
5310 PROCflash(0):PROCcurs(S%,N%)
5320 PROCnote(S%,N%,pi%,du%,0)
5330 CLS:PRINTFNdouble("Dumping.")
5340 VDU 2,1,27,1,65,1,8,1,10
5350 FOR X%=C% TO 960 STEP 32
5360 VDU 2,1,27,1,76,1,208,1,2
5370 FOR Y%=0 TO 960 STEP 4
5380 A%=0:FOR Z%=0 TO 7
5390 IF POINT(X%+Z%*4,Y%)=0 A%=A%+2^(7-
Z%)
5400 NEXT:VDU 1,A%,1,A%,1,A%
5410 NEXT:VDU 1,10
5420 NEXT:VDU 1,27,1,64,3,7
5430 PROCcurs(S%,N%):VDU 12,26
5440 PROCnote(S%,N%,pi%,du%,0)
5450 ENDPROC
5460 :
5470 DATA 134,131,134,130,133,130,132,1
30,132,129,9,128
5480 DATA 156,159,155,159,155,158,155,1
57,154,157,128,9
5490 :
5500 DATA 0,0,0,8,4,0,0,-4,-8,4,0,-4
5510 :
5520 DATA 5,13,21,25,33,41,49,53,61,69,
73,81,89,97,101,109,117
5530 DATA 121,129,137,145,149,157,165,1
69,177,185,193,197
5540 :
5550 DATA 135,130,270,98,238,138,278,11
0,250,150,218
5560 DATA 136,86,226,114,254,74,214,106
,246,66,206
5570 :
5580 DATA 4,1,5,2,6
5590 DATA 7,3,6,2,5
```

Listing 4

```
10 REM >PlayBas (Po84) - AUTUMN file
player
20 REM By Dave Lawrence/Dave Acton
30 REM For BBC B/B+/M/C
40 REM (c) Acorn User April 1987/Dec
'91
50 :
60 MODE 7
70 HIMEM=&6000:S%=&6000
80 DIM p%(3),d%(3),env% 14
90 :
100 INPUT"AUTUMN file name  : "name$
110 OSCLI("*LOAD "+name$+" 6000")
120 REPEAT
130 INPUT"Tempo (1=fastest) : "tempo%
140 UNTIL tempo%>0
150 REPEAT
160 INPUT"Repeat tune? Y/N  : "rep$
170 rep$=CHR$(ASC(rep$) AND &DF)
180 UNTIL rep$="Y" OR rep$="N"
190 REPEAT
200 FOR I%=0 TO 2
210 p%(I%+1)=S%+?(S%+I%*2)+256*?(S%+I%
*2+1)
220 d%(I%+1)=FALSE
230 NEXT
240 REPEAT
250 FOR I%=1 TO 3
260 IF ADVAL(-5-I%)>0 PROCsound
270 NEXT
280 UNTIL d%(1) AND d%(2) AND d%(3)
290 UNTIL rep$="N"
300 END
310 :
320 DEF PROCsound
330 IF d%(I%) ENDPROC
340 p%=?p%(I%):d%=?(p%(I%)+1)
350 IF p%=254 PROCenv:ENDPROC
360 IF p%=255 d%(I%)=TRUE:ENDPROC
370 IF p%=0 V%=0 ELSE V%=I%
380 SOUND I%,V%,p%,d%*tempo%
390 p%(I%)=p%(I%)+2
400 ENDPROC
410 :
420 DEF PROCenv
430 IF ADVAL(-5-I%)<>15 ENDPROC
440 ?env%=I%
450 FOR J%=1 TO 13
460 J%?env%=?(p%(I%)+J%)
470 NEXT
480 X%=env%:Y%=env% DIV 256
490 A%=8:CALL &FFF1
500 p%(I%)=p%(I%)+14
510 ENDPROC
```

Listing 5

```
10 REM >StarPLAY (Po85)- AUTUMN file
player
20 REM By Dave Acton
30 REM For BBC B/B+/M/C
40 REM (c) BAU April 1987 & December
1991
50 :
60 MODE 7
70 command=&F2:name=&70:addr=&72
80 read=&74:fin=&76:free=&79
90 start=&86:point=&88:voice=&8E
100 tempo=&8F:string=&AE0
110 osfile=&FFDD:osbyte=&FFF4
120 osword=&FFF1:oscli=&FFF7
130 FOR pass%=0 TO 2 STEP 2
140 P%=&900
150 [OPT pass%
160 .play
170 LDY #4
180 JSR skipspace
190 TYA
200 CLC
210 ADC command
220 STA command
230 LDA command+1
240 ADC #0
250 STA command+1
260 LDY #0
270 .copyloop
280 LDA (command),Y
290 STA string,Y
300 INY
310 CMP #32
320 BNE copyloop
330 LDA #13
340 STA string,Y
350 LDA #0
360 LDX #15
370 .clear
380 STA addr,X
390 DEX
400 BPL clear
410 JSR skipspace
420 .decode
430 LDA (command),Y
440 CMP #32
450 BEQ done
460 CMP #ASC"0"
470 BCC syntax
480 CMP #ASC"9"+1
490 BCC number
500 CMP #ASC"F"+1
510 BCS syntax
520 CMP #ASC"A"
530 BCC syntax
540 SBC #55
550 JMP add
560 .number
570 EOR #48
580 .add
590 LDX #4
600 .shift
610 ASL addr
620 ROL addr+1
630 DEX
640 BNE shift
650 CLC
660 ADC addr
670 STA addr
680 INY
690 BCC decode
700 INC addr+1
710 JMP decode
720 .syntax
730 BRK:EQUB 0
740 EQUS "Syntax: *PLAY <name> <addr>
<tempo>"+CHR$0
750 :
760 .done
770 LDA addr
780 STA start
790 LDA addr+1
800 STA start+1
810 JSR skipspace
820 CMP #ASC"9"+1
830 BCS syntax
840 CMP #ASC"1"
850 BCC syntax
860 SBC #48
870 STA tempo
880 LDA #string MOD 256
890 STA name
900 LDA #string DIV 256
910 STA name+1
920 LDX #name MOD 256
930 LDY #name DIV 256
940 LDA #&FF
950 JSR osfile
960 JSR initpoint
970 .repeat
980 LDA #3
990 STA voice
1000 .voiceloop
1010 JSR dovoice
1020 DEC voice
1030 BNE voiceloop
1040 BIT &FF
1050 BMI escape
1060 LDA fin
1070 AND fin+1
1080 AND fin+2
1090 BEQ repeat
1100 RTS
1110 :
1120 .escape
1130 BRK:EQUB 17
1140 EQUS "Escape"+CHR$0
1150 :
1160 .initpoint
1170 LDY #5
1180 .copypoint
1190 LDA (start),Y
1200 STA point,Y
1210 DEY
1220 BPL copypoint
1230 LDX #2
1240 LDA #0
1250 .finloop
1260 STA fin,X
1270 DEX
1280 BPL finloop
1290 RTS
1300 :
1310 .dovoice
1320 LDX voice
1330 LDA fin-1,X
1340 BNE nosound
1350 LDA #251
1360 SEC
1370 SBC voice
1380 TAX
1390 LDY #&FF
1400 LDA #128
1410 JSR osbyte
1420 STX free
1430 CPX #0
1440 BEQ nosound
1450 LDA voice
1460 ASL A
1470 TAY
1480 LDA point-2,Y
1490 CLC
1500 ADC start
1510 STA read
1520 LDA point-1,Y
1530 ADC start+1
1540 STA read+1
1550 LDY #0
1560 LDA (read),Y
1570 CMP #&FE
1580 BNE notenv
1590 JSR env
1600 JSR next
1610 JMP dovoice
1620 .notenv
1630 CMP #&FF
1640 BNE notfin
1650 LDX voice
1660 STA fin-1,X
1670 JMP nosound
1680 .notfin
1690 JSR sound
1700 .next
1710 LDA voice
1720 ASL A
1730 TAY
1740 LDA read
1750 SEC
1760 SBC start
1770 STA point-2,Y
1780 LDA read+1
1790 SBC start+1
1800 STA point-1,Y
1810 .nosound
1820 RTS
1830 :
1840 .sound
1850 STA pitch
1860 JSR incread
1870 LDA #0
1880 LDX tempo
1890 .howlong
1900 ADC (read),Y
```

```
1910 DEX
1920 BNE howlong
1930 STA dur
1940 JSR incread
1950 LDA voice
1960 STA note
1970 STA volume
1980 LDA pitch
1990 BNE notrest
2000 STA volume
2010 .notrest
2020 LDX #note MOD 256
2030 LDY #note DIV 256
2040 LDA #7
2050 JMP osword
2060 :
2070 .env
2080 LDA free
2090 CMP #15
2100 BEQ empty
2110 RTS
2120 .empty
2130 LDA voice
2140 STA pars
2150 LDX #1
2160 .envloop
2170 JSR incread
2180 LDA (read),Y
2190 STA pars,X
2200 INX
2210 CPX #14
2220 BNE envloop
2230 LDX #pars MOD 256
2240 LDY #pars DIV 256
2250 LDA #8
2260 JSR osword
2270 :
2280 .incread
2290 INC read
2300 BNE nothigh
2310 INC read+1
2320 .nothigh
2330 RTS
2340 :
2350 .notspace
2360 INY
2370 .findspace
2380 LDA (command),Y
2390 CMP #32
2400 BNE notspace
2410 RTS
2420 :
2430 .space
2440 INY
2450 .skipspace
2460 LDA (command),Y
2470 CMP #32
2480 BEQ space
2490 RTS
2500 :
2510 .note   BRK:BRK
2520 .volume BRK:BRK
2530 .pitch  BRK:BRK
2540 .dur    BRK:BRK
2550 .pars
2560 ]:NEXT pass%
2570 total%=0
2580 FOR check%=&900 TO P%-1
2590 total%=total%+?check%
2600 NEXT check%
2610 IF total%<>52235 PRINT"Checksum er
ror - please check listing":END
2620 PRINT"Saving *PLAY"
2630 OSCLI"SAVE PLAY 900 "+STR$~P%+" "+
STR$~play
```

Listing 6

```
   10 REM >StarEVENT (Po86) - AUTUMN fil
e player
   20 REM By Dave Acton
   30 REM For BBC B/B+/M/C
   40 REM (c) BAU April 1987 & December
1991
   50 :
   60 MODE 7
   70 command=&F2:name=&70:addr=&72
   80 read=&74:fin=&76:free=&79
   90 start=&86:point=&88:voice=&8E
  100 tempo=&8F:string=&AE0
  110 osfile=&FFDD:osbyte=&FFF4
  120 osword=&FFF1:oscli=&FFF7
  130 FOR pass%=0 TO 2 STEP 2
  140 P%=&900
  150 [OPT pass%
  160 .play
  170 LDY #5
  180 JSR skipspace
  190 TYA
  200 CLC
  210 ADC command
  220 STA command
  230 LDA command+1
  240 ADC #0
  250 STA command+1
  260 LDY #0
  270 .copyloop
  280 LDA (command),Y
  290 STA string,Y
  300 INY
  310 CMP #32
  320 BNE copyloop
  330 LDA #13
  340 STA string,Y
  350 LDA #0
  360 LDX #15
  370 .clear
  380 STA addr,X
  390 DEX
  400 BPL clear
  410 JSR skipspace
  420 .decode
  430 LDA (command),Y
  440 CMP #32
  450 BEQ done
  460 CMP #ASC"0"
  470 BCC syntax
  480 CMP #ASC"9"+1
  490 BCC number
  500 CMP #ASC"F"+1
  510 BCS syntax
  520 CMP #ASC"A"
  530 BCC syntax
  540 SBC #55
  550 JMP add
  560 .number
  570 EOR #48
  580 .add
  590 LDX #4
  600 .shift
  610 ASL addr
  620 ROL addr+1
  630 DEX
  640 BNE shift
  650 CLC
  660 ADC addr
  670 STA addr
  680 INY
  690 BCC decode
  700 INC addr+1
  710 JMP decode
  720 .syntax
  730 BRK:BRK
  740 ]:$P%="Syntax: *EVENT <name> <addr
> <tempo>":P%=P%+LEN$P%
  750 [OPT pass%:BRK
  760 :
  770 .done
  780 LDA addr
  790 STA start
  800 LDA addr+1
  810 STA start+1
  820 JSR skipspace
  830 CMP #ASC"9"+1
  840 BCS syntax
  850 CMP #ASC"1"
  860 BCC syntax
  870 SBC #48
  880 STA tempo
  890 LDA #string MOD 256
  900 STA name
  910 LDA #string DIV 256
  920 STA name+1
  930 LDX #name MOD 256
  940 LDY #name DIV 256
  950 LDA #&FF
  960 JSR osfile
  970 SEI
  980 LDA #event MOD 256:STA &220
  990 LDA #event DIV 256:STA &221
 1000 CLI
 1010 LDA #14:LDX #0:JSR osbyte
 1020 LDA #230:LDX #255:LDY #0:JSR osbyt
e
 1030 JSR initpoint
 1040 .repeat
 1050 LDA #3
 1060 STA voice
 1070 .voiceloop
 1080 JSR dovoice
 1090 DEC voice
 1100 BNE voiceloop
 1110 BIT &FF
 1120 BMI escape
 1130 LDA fin
 1140 AND fin+1
 1150 AND fin+2
 1160 BNE initpoint
 1170 RTS
 1180 :
 1190 .escape
 1200 BRK
 1210 ]:?P%=17:P%=P%+1
 1220 $P%="Escape":P%=P%+LEN$P%
 1230 [OPT pass%:BRK
 1240 :
 1250 .initpoint
 1260 LDY #5
 1270 .copypoint
 1280 LDA (start),Y
 1290 STA point,Y
 1300 DEY
 1310 BPL copypoint
 1320 LDX #2
 1330 LDA #0
 1340 .finloop
 1350 STA fin,X
 1360 DEX
 1370 BPL finloop
 1380 RTS
 1390 :
 1400 .dovoice
 1410 LDX voice
 1420 LDA fin-1,X
 1430 BNE nosound
 1440 LDA #251
 1450 SEC
 1460 SBC voice
 1470 TAX
 1480 LDY #&FF
 1490 LDA #128
 1500 JSR osbyte
 1510 STX free
 1520 CPX #0
 1530 BEQ nosound
 1540 LDA voice
 1550 ASL A
 1560 TAY
 1570 LDA point-2,Y
 1580 CLC
 1590 ADC start
 1600 STA read
 1610 LDA point-1,Y
 1620 ADC start+1
 1630 STA read+1
 1640 LDY #0
 1650 LDA (read),Y
 1660 CMP #&FE
 1670 BNE notenv
 1680 JSR env
 1690 JSR next
 1700 JMP dovoice
 1710 .notenv
 1720 CMP #&FF
 1730 BNE notfin
 1740 LDX voice
 1750 STA fin-1,X
 1760 JMP nosound
 1770 .notfin
 1780 JSR sound
 1790 .next
 1800 LDA voice
 1810 ASL A
 1820 TAY
 1830 LDA read
 1840 SEC
 1850 SBC start
 1860 STA point-2,Y
 1870 LDA read+1
 1880 SBC start+1
 1890 STA point-1,Y
 1900 .nosound
 1910 RTS
 1920 :
 1930 .sound
 1940 STA pitch
 1950 JSR incread
 1960 LDA #0
 1970 LDX tempo
 1980 .howlong
 1990 ADC (read),Y
 2000 DEX
 2010 BNE howlong
 2020 STA dur
 2030 JSR incread
 2040 LDA voice
 2050 STA note
 2060 STA volume
 2070 LDA pitch
 2080 BNE notrest
 2090 STA volume
 2100 .notrest
 2110 LDX #note MOD 256
 2120 LDY #note DIV 256
 2130 LDA #7
 2140 JMP osword
 2150 :
 2160 .env
 2170 LDA free
 2180 CMP #15
 2190 BEQ empty
 2200 RTS
 2210 .empty
 2220 LDA voice
 2230 STA pars
 2240 LDX #1
 2250 .envloop
 2260 JSR incread
 2270 LDA (read),Y
 2280 STA pars,X
 2290 INX
 2300 CPX #14
 2310 BNE envloop
 2320 LDX #pars MOD 256
 2330 LDY #pars DIV 256
 2340 LDA #8
 2350 JSR osword
 2360 :
 2370 .incread
 2380 INC read
 2390 BNE nothigh
 2400 INC read+1
 2410 .nothigh
 2420 RTS
 2430 :
 2440 .notspace
 2450 INY
 2460 .findspace
 2470 LDA (command),Y
 2480 CMP #32
 2490 BNE notspace
 2500 RTS
 2510 :
 2520 .space
 2530 INY
 2540 .skipspace
 2550 LDA (command),Y
 2560 CMP #32
 2570 BEQ space
 2580 RTS
 2590 :
 2600 .event
 2610 PHA:TXA:PHA:TYA:PHA
 2620 JSR repeat
 2630 PLA:TAY:PLA:TAX:PLA
 2640 RTS
 2650 .note   BRK:BRK
 2660 .volume BRK:BRK
 2670 .pitch  BRK:BRK
 2680 .dur    BRK:BRK
 2690 .pars
 2700 ]:NEXT pass%
 2710 total%=0
 2720 FOR check%=&900 TO P%-1
 2730 total%=total%+?check%
 2740 NEXT check%
 2750 IF total%<>57347 PRINT"Checksum er
ror - please check listing":END
 2760 PRINT"Saving *EVENT"
 2770 OSCLI"SAVE EVENT 900 "+STR$~P%+" "
+STR$~play
```

Listing 7

```
   10 REM >Create (Po87) - demonstration
 AUTUMN file
   20 REM By David Lawrence
   30 REM For BBC B/B+/M/C
   40 REM (c) BAU December 1991
   50 :
   60 DIM notes(37)
   70 FOR i=1 TO 37
   80 READ notes(i)
   90 NEXT
  100 n$=""
  110 FOR char=ASC"0" TO ASC"9":n$=n$+CH
R$char:NEXT
  120 FOR char=ASC"a" TO ASC"z":n$=n$+CH
R$char:NEXT
  130 n$=n$+"@"
  140 d$="!#.$.%.^...&...'"
  150 out=OPENOUT("AutumnD")
  160 FOR i=0 TO 5:BPUT #out,0:NEXT
  170 FOR voice=0 TO 2
  180  dur=-1
  190  ptr=PTR#out
  200  PTR#out=voice*2
  210  BPUT #out,ptr MOD 256
  220  BPUT #out,ptr DIV 256
  230  PTR#out=ptr
  240  BPUT #out,&FE
  250  FOR env=1 TO 13
  260   READ data
  270   BPUT #out,data
  280  NEXT
  290  REPEAT
  300   READ data$
  310   IF data$<>"(end)" PROCdata(data$
)
  320  UNTIL data$="(end)"
  330  BPUT #out,&FF
  340  BPUT #out,&FF
  350 NEXT
  360 CLOSE #out
  370 END
  380 :
  390 DEF PROCdata(data$)
  400 REPEAT
  410  a$=LEFT$(data$,1)
  420  data$=MID$(data$,2)
  430  n=INSTR(n$,a$)
  440  d=INSTR(d$,a$)
  450  IF d>0 dur=d
  460  IF n>0 BPUT #out,notes(n):BPUT #o
ut,dur
  470 UNTIL data$=""
  480 ENDPROC
  490 :
  500 DATA 0,21,29,37,41,45,49,53,57,65
  510 DATA 69,77,81,85,89,93,97,101,105
  520 DATA 109,113,117,125,133,137,141
  530 DATA 145,149,153,157,161,165,173
  540 DATA 181,185,189,193
  550 :
  560 DATA 1,0,0,0,0,0,0,127,255,255,255
,120,80
  570 DATA #0,(end)
  580 DATA 1,0,0,0,0,0,0,90,0,0,166,90,0
  590 DATA #0$0adgladglkiegedaedba9a8463
  600 DATA 46#0136$a78da8b2586b96a136a89
  610 DATA abdfbgab2#689bgbga9abg6g9gabd
  620 DATA i8iaibdfk9kbkdeglaldlfgimbmfm
  630 DATA $gdab'g#gb9b%6#0$069bg69bgb96
  640 DATA a10l1#ki$hdi80ii#ge$dae40#ec$
  650 DATA b#ec$b20#ec$b#ec$b20#bd$eb9#d
  660 DATA b$a#db$a#ba$9#ba$9#a9$8bd3#89
  670 DATA adidiabdeieibe689bgbg9abdgdga
  680 DATA d468b2b4b689d3d6d89ae4e8e9abg
  690 DATA 6g9g$a8461gdae48a5ifbg69b6b96
  700 DATA 4e0bdeg6#a136%a,(end)
  710 DATA 3,1,255,0,1,1,1,126,0,0,240,1
26,126
  720 DATA #qnoqvlvmvnoqvlvmvnvwxoxwvuvw
  730 DATA @q@t@suvyoysyqyvxoqswnvqvmnou
  740 DATA ^v#vxuwvusvxsvqpnmpsmvmusquwq
  750 DATA uonmlnqlulsuvxwvus@zxwvuvs!su
  760 DATA vusu#v!usus#sq$qwu#wp$q#un$o#
  770 DATA qm$n^v$sp^w$uqx#xz@xvu$v#vxwv
  780 DATA vusx$q!pqpq#qsuw@wuw&q#0wuvw@
  790 DATA q@s@uvw@q@s@uwxyqyxwxwvxqxnxp
  800 DATA rswuwrwvusvnvlvmnotqtntsqosws
  810 DATA ystvwytwotmljmomtouvwyuwrumlk
  820 DATA mrmurxwvxsxoxwvuwrwnwvusvnsur
  830 DATA $s#xv$s#vn$o#so$m#oi$k#wu$q#u
  840 DATA m$n#qn$l#ng$i^o$mk^q$nls#suvs
  850 DATA on$o#osqonmls%m#llmnoqltlsqos
```

```
860 DATA vosnmnpqsmvmusquwuywuvwyxwvu@
870 DATA yxwvusqvqsonvmu&v,(end)
```

Listing 8

```
10 REM >Sideways printing (Po88)
20 REM By John Knight
30 REM For BBC B/B+/M/C/E
40 REM (c) BAU April 1987 & December
1991
50 :
60 ON ERROR GOTO 220
70 VDU 3:MODE 7
80 PROConceonly
90 :
100 REPEAT
110 line=Ø:ptr%(line)=Ø
120 REPEAT
130 PROCfindlines
140 PROCreadfile
150 UNTIL morelines=FALSE
160 PROCagain
170 UNTIL again$="N"
180 MODE 7
190 END
200 :
210 REM Error Handler
220 VDU 3,7:REPORT
230 IF ERR=17 THEN END
240 PRINT" in line " ERL
250 PRINT''"Press any key to continue"
;
260 key=GET
270 RUN
280 END
290 :
300 DEF FNquery(q$)
310 PRINT q$;
320 INPUT""q$
330 =q$
340 :
350 DEF FNgetletter
360 S%=ptr%(line)
370 B%=text?S%
380 IF B%=13 OR B%=Ø THEN =32
390 ptr%(line)=ptr%(line)+1
400 IF B%<32 GOTO 360
410 activelines=activelines+1
420 =B%
430 :
440 DEF FNgetbyte
450 sub=sub+1
460 =text?sub
470 :
480 DEF PROConceonly
490 PROCsetlimits
500 FOR A%=Ø TO maxwidth
510 ptr%(A%)=-1
520 NEXT
530 PROCmccode
540 PRINTSPC(8);"ViewSheet Printer"
550 PRINTSPC(8);"================="
560 VDU 28,Ø,24,39,6,12
570 sub=Ø
580 ENDPROC
590 :
600 DEF PROCfindlines
610 IF NOT morelines PROCgetfile
620 VDU 3,12
630 PRINT''"Please wait:"
640 PRINT"Assembling line pointers.";
650 PROCfindcrs
660 morelines=FALSE
670 IF sub<size THEN IF line>=pagelen
morelines=TRUE
680 IF line=-1 PRINT "File Empty":VDU
7:END
690 ENDPROC
700 :
710 DEF PROCfindcrs
720 REPEAT
730 REPEAT UNTIL FNgetbyte=13 OR NOT (
sub<size)
740 PRINT".";
750 IF sub>=size GOTO 770
760 line=line+1 :ptr%(line)=sub+1
770 UNTIL sub>=size OR line>=pagelen
780 ENDPROC
790 :
800 DEF PROCreadfile
810 L%=line
820 VDU 12,2,1,27,1,ASC"@"
830 VDU 1,27,1,ASC"A",1,8
840 PRINT"Printing in progress.."
850 n1=maxdots MOD 256
860 n2=maxdots DIV 256
870 VDU 1,13,1,10
880 REPEAT
890 activelines = Ø
900 VDU 1,27,1,ASC"L",1,n1,1,n2
910 FOR line = pagelen TO Ø STEP-1
920 IF line>L% A%=32 ELSE A%=FNgetlett
er
930 CALLvducode
940 NEXT
950 VDU 1,13,1,10
960 UNTIL activelines=Ø
970 ENDPROC
980 :
990 DEF PROCsetlimits
1000 DIM ostext 5Ø,code 100
1010 maxtextsize=&5000
1020 DIM text maxtextsize+4
1030 maxdots=96Ø
1040 maxwidth=(maxdots/10)-1
1050 DIM ptr%(maxwidth)
1060 morelines=FALSE
1070 ENDPROC
1080 :
1090 DEF PROCagain
1100 VDU 3,12 :
1110 PRINT"Print another Sheet";
1120 REPEAT
1130 again$=CHR$( ASC(FNquery("(Y/N) ?"
) ) AND &DF)
1140 UNTIL again$="Y" OR again$="N"
1150 ENDPROC
1160 :
1170 DEF PROCgetfile
1180 CLS
1190 PRINT"Enter Filename or * Command:
"
1200 VDU 28,Ø,24,39,7,12
1210 REPEAT
1220 file$=FNquery(">=")
1230 oscomm=(LEFT$(file$,1) = "*")
1240 IF NOT oscomm PROCgetfilesize ELSE
size=Ø :PROCoscli(file$)
1250 UNTIL (NOToscomm) AND (size> Ø)
1260 IF size> maxtextsize PRINT"Too big
-   for now...":END
1270 PROCoscli("LOAD "+file$+"  "+STR$~
(text) )
1280 text!size = Ø
1290 PRINT "Double or Single height ";
1300 REPEAT
1310 double$=CHR$( ASC(FNquery("(D/S) ?
") ) AND &DF)
1320 UNTIL double$="D" OR double$="S"
1330 IF double$="D" ?double=1 ELSE ?dou
ble=Ø
1340 IF double$="D" dots=20 ELSE dots=1
Ø
1350 pagelen=(maxdots/dots)-1
1360 sub=-1 :VDU 28,Ø,24,39,6
1370 ENDPROC
1380 :
1390 DEFPROCgetfilesize
1400 size=EXT#(OPENIN(file$)):CLOSE #Ø
1410 IF size<1 PRINT "No such data!"''
1420 ENDPROC
1430 :
1440 DEF PROCoscli(star$)
1450 $ostext=star$
1460 X%=ostext MOD 256
1470 Y%=ostext DIV 256
1480 CALL&FFF7
1490 ENDPROC
1500 :
1510 DEF PROCmccode
1520 osword=&FFF1:oswrch=&FFEE
1530 FOR pass=Ø TO 2 STEP 2
1540 P%=code
1550 [OPT pass
1560 .double
1570 NOP
1580 .block
1590 NOP:NOP:NOP
1600 NOP:NOP:NOP
1610 NOP:NOP:NOP
1620 \
1630 .vducode
1640 STA block
1650 LDA #10
1660 LDX #block MOD 256
1670 LDY #block DIV 256
1680 JSR osword
1690 LDX #8
1700 \
1710 .vdulloop
1720 LDA #1        :JSR oswrch
1730 LDA block,X :JSR oswrch
1740 LDA double  :BEQ nextline
1750 LDA #1        :JSR oswrch
1760 LDA block,X :JSR oswrch
1770 .nextline
1780 DEX           :BNE vdulloop
1790 LDA double  :BEQ normspc
1800 LDA #1        :JSR oswrch
1810 LDA #Ø        :JSR oswrch
1820 LDA #1        :JSR oswrch
1830 LDA #Ø        :JSR oswrch
1840 .normspc
1850 LDA #1        :JSR oswrch
1860 LDA #Ø        :JSR oswrch
1870 LDA #1        :JSR oswrch
1880 LDA #Ø        :JSR oswrch
1890 RTS
1900 ]
1910 NEXT
1920 ENDPROC
```

Listing 9

```
10 REM >Curve (Po89)
20 REM By G Blanchard
30 REM For B/B+/M/C/E/A
40 REM (c) BAU September 1988 & Decem
ber 1991
50 :
60 MODE Ø
70 DIM x(3),y(3),a(3),b(3)
80 x(Ø)=Ø:y(Ø)=511
90 x(3)=1279:y(3)=511
100 n=100
110 :
120 REPEAT
130 INPUT "Enter two coordinates (four
numbers)=>"x(1),y(1),x(2),y(2)
140 CLS
150 MOVE x(Ø),y(Ø)
160 a(Ø)=x(Ø)
170 b(Ø)=y(Ø)
180 a(1)=x(1)+2*x(Ø)
190 b(1)=y(1)+2*y(Ø)
200 a(2)=x(2)+2*x(3)
210 b(2)=y(2)+2*y(3)
220 a(3)=x(3)
230 b(3)=y(3)
240 :
250 FOR I%=Ø TO n
260 t=I%/n
270 t1=1-t
280 x=a(Ø)*t1^3+a(1)*t*t1^2+a(2)*t1*t^
2+a(3)*t^3
290 y=b(Ø)*t1^3+b(1)*t*t1^2+b(2)*t1*t^
2+b(3)*t^3
300 DRAW x,y
310 NEXT I%
320 :
330 UNTIL FALSE
```

Listing 10

```
10 REM >Surface (Po810)
20 REM By George Blanchard
30 REM For B/B+/M/C/E/A
40 REM (c) BAU September 1988 & Decem
ber 1991
50 :
60 MODE Ø
70 L%=4
80 N%=25
90 DIM x(2,3,3),a1(2,3,3),u(2,3),a(2,
3),p(2)
100 DIM r(1,2,L%,N%)
110 :
120 FOR I%=Ø TO 3
130 FOR J%=Ø TO 3
140 FOR K%=Ø TO 2
150 READ x(K%,I%,J%)
160 NEXT
170 NEXT
180 NEXT
190 :
200 VDU 29,160;200;
210 PROCpatch
220 :
230 REPEAT
240 INPUT "Hit return for another view
"a$
250 PROCredraw(Ø,1)
260 INPUT "Hit return for another view
"a$
270 PROCredraw(Ø,2)
280 INPUT "Hit return for another view
"a$
290 PROCredraw(2,1)
300 INPUT "Hit return for isometric vi
ew"a$
310 PROCiso
320 UNTIL FALSE
330 END
340 :
350 DEF PROCpatch
360 PROCcoeffs1
370 FOR T%=Ø TO L%
380 t=T%/L%
390 PROCval(t)
400 PROCcoeffs
410 FOR S%=Ø TO N%
420 s=S%/N%
430 PROCpoint(s)
440 FOR I%=Ø TO 2
450 r(Ø,I%,T%,S%)=p(I%)
460 NEXT
470 IF S%=Ø THEN MOVE p(Ø),p(1) ELSE D
RAW p(Ø),p(1)
480 NEXT
490 NEXT
500 PROCcoeffs2
510 FOR T%=Ø TO L%
520 t=T%/L%
530 PROCval(t)
540 PROCcoeffs
550 FOR S%=Ø TO N%
560 s=S%/N%
570 PROCpoint(s)
580 FOR I%=Ø TO 2
590 r(1,I%,T%,S%)=p(I%)
600 NEXT
610 IF S%=Ø THEN MOVE p(Ø),p(1) ELSE D
RAW p(Ø),p(1)
620 NEXT
630 NEXT
640 ENDPROC
650 :
660 DEF PROCcoeffs1
670 FOR K%=Ø TO 2
680 FOR I%=Ø TO 3
690 a1(K%,I%,Ø)=x(K%,I%,Ø)
700 a1(K%,I%,1)=x(K%,I%,1)+x(K%,I%,Ø)+
x(K%,I%,Ø)
710 a1(K%,I%,2)=x(K%,I%,2)+x(K%,I%,3)+
x(K%,I%,3)
720 a1(K%,I%,3)=x(K%,I%,3)
730 NEXT
740 NEXT
750 ENDPROC
760 :
770 DEF PROCcoeffs2
780 FOR K%=Ø TO 2
790 FOR I%=Ø TO 3
800 a1(K%,I%,Ø)=x(K%,Ø,I%)
810 a1(K%,I%,1)=x(K%,1,I%)+x(K%,Ø,I%)+
x(K%,Ø,I%)
820 a1(K%,I%,2)=x(K%,2,I%)+x(K%,3,I%)+
x(K%,3,I%)
830 a1(K%,I%,3)=x(K%,3,I%)
840 NEXT
850 NEXT
860 ENDPROC
870 :
880 DEF PROCval(t)
890 LOCAL t1
900 t1=1-t
910 FOR I%=Ø TO 2
920 FOR J%=Ø TO 3
930 u(I%,J%)=a1(I%,J%,Ø)*t1*t1*t1+a1(I
%,J%,1)*t*t1*t1+a1(I%,J%,2)*t1*t*t+a1(I%
,J%,3)*t*t*t
940 NEXT
950 NEXT
960 ENDPROC
970 :
980 DEF PROCcoeffs
990 FOR I%=Ø TO 2
1000 a(I%,Ø)=u(I%,Ø)
1010 a(I%,1)=u(I%,1)+u(I%,Ø)+u(I%,Ø)
1020 a(I%,2)=u(I%,2)+u(I%,3)+u(I%,3)
1030 a(I%,3)=u(I%,3)
1040 NEXT
1050 ENDPROC
1060 :
1070 DEF PROCpoint(s)
1080 LOCAL s1
1090 s1=1-s
1100 FOR I%=Ø TO 2
1110 p(I%)=a(I%,Ø)*s1*s1*s1+a(I%,1)*s*s
1*s1+a(I%,2)*s1*s*s+a(I%,3)*s*s*s
1120 NEXT
1130 ENDPROC
1140 :
1150 DEF PROCredraw(x%,y%)
1160 LOCAL ax$
1170 ax$="xyz"
1180 CLS
1190 PRINT MID$(ax$,x%+1,1);" >          "
;MID$(ax$,y%+1,1);" ^"
1200 FOR I%=Ø TO L%
1210 MOVE r(Ø,x%,I%,Ø),r(Ø,y%,I%,Ø)
1220 FOR J%=Ø TO N%
1230 DRAW r(Ø,x%,I%,J%),r(Ø,y%,I%,J%)
1240 NEXT
1250 NEXT
1260 FOR I%=Ø TO L%
1270 MOVE r(1,x%,I%,Ø),r(1,y%,I%,Ø)
1280 FOR J%=Ø TO N%
1290 DRAW r(1,x%,I%,J%),r(1,y%,I%,J%)
1300 NEXT
1310 NEXT
1320 ENDPROC
1330 :
1340 DEF PROCiso
1350 LOCAL c,s,x,y
1360 s=1/2
1370 c=SQR(3)/2
1380 CLS
1390 PRINT "Isometric view."
1400 FOR I%=Ø TO L%
1410 FOR J%=Ø TO N%
1420 x=c*(r(Ø,Ø,I%,J%)+r(Ø,2,I%,J%))
1430 y=r(Ø,1,I%,J%)+s*(r(Ø,2,I%,J%)-r(Ø
,Ø,I%,J%))
1440 IF J%=Ø THEN MOVE x,y ELSE DRAW x,
y
1450 NEXT
1460 NEXT
1470 FOR I%=Ø TO L%
1480 FOR J%=Ø TO N%
1490 x=c*(r(1,Ø,I%,J%)+r(1,2,I%,J%))
1500 y=r(1,1,I%,J%)+s*(r(1,2,I%,J%)-r(1
,Ø,I%,J%))
1510 IF J%=Ø THEN MOVE x,y ELSE DRAW x,
y
1520 NEXT
1530 NEXT
1540 ENDPROC
1550 :
1560 DATA 100,100,Ø
1570 DATA 400,400,300
1580 DATA 400,400,300
1590 DATA 700,100,Ø
1600 :
1610 DATA 100,400,200
1620 DATA 400,700,600
1630 DATA 400,700,600
1640 DATA 700,400,200
1650 :
1660 DATA 100,400,400
1670 DATA 400,700,Ø
1680 DATA 400,700,Ø
1690 DATA 700,400,400
1700 :
1710 DATA 100,100,600
1720 DATA 600,400,300
1730 DATA 400,400,300
1740 DATA 700,100,600
```

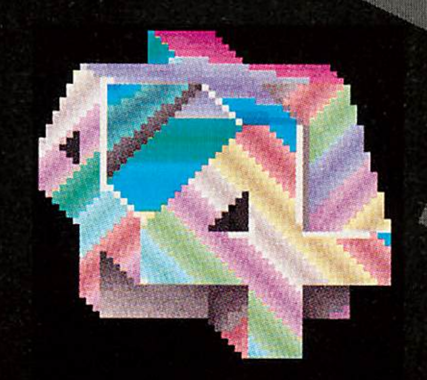
Listing 11

```
10 ENVELOPE1,6,-1,Ø,Ø,4,Ø,Ø,1,-1,-1,-
2,83,7:REPEAT:FORc=1TO3:IFADVAL(-5-c)>Ø
SOUNDc,1,RND(12)*4+101,RND(10)*8:NEXT:UN
TILØELSENEXT:UNTILØ
```

THE FOURTH DIMENSION

Software Catalogue

THE Archimedes Games Specialists



BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

Grievous Bodily 'ARM





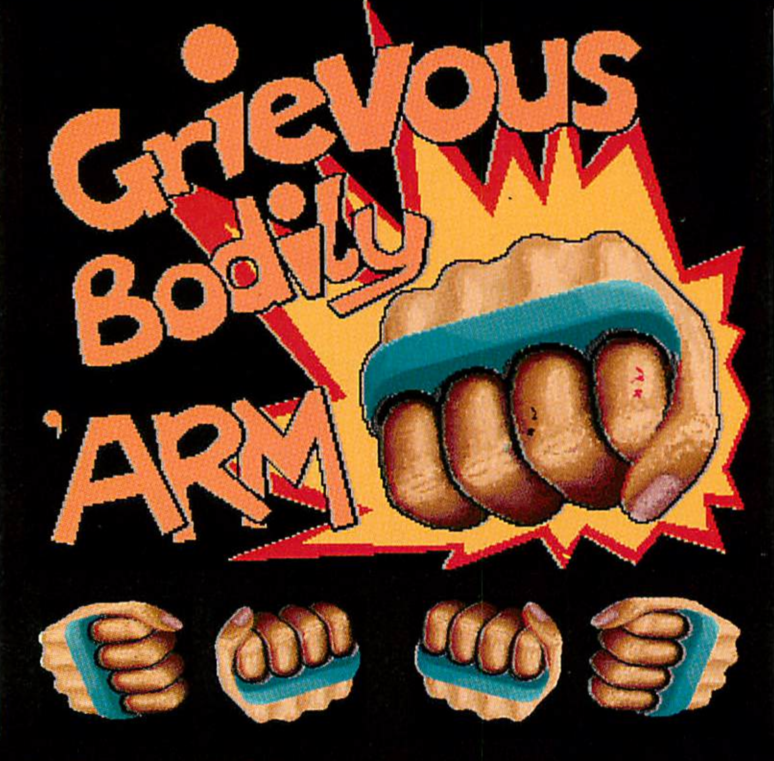
"A Brutal Uninhibited Arcade Beat'em Up!"

The Plot

An evil scientist discovers a cheap and easy way to manufacture vast quantities of illegal narcotics. His intentions - to turn cities full of people into junkies, all dependent on his supplies.

Mass addiction spreads throughout the city within days - like a deadly plague. Gang violence, looting, mugging - people will do anything to get their next fix, your only chance for survival is to get the crazy scientist yourself and make sure he will never be able to make any drugs again.

Punching, kicking - finding weapons along the way, you fight through hordes of junkies in streets, warehouses and sewers until you reach the mad scientist's laboratory where you must 'deal with him for good'.



The Development Team

Comprises a Software Engineer and Graphic Artist who previously worked for years in the American arcade and home console markets, writing ultra-playable games that have sold around 1 million copies worldwide. Now writing for the technically superior Acorn RISC based range of computers.

Techno Stuff

Frame Rate *50 Frames/Second Constant*

Object Code *Handwritten Arm Code and Basic*

Graphics *Over 1.5 Mbyte. High Speed Custom Written Graphics Handlers*

Sound *Digitally Sampled*

Computer *Archimedes with 1 Mbyte or more*

Inputs *Keyboard or Joystick*

BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully late November '91





BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

Saloon Cars





The **Ultimate** Driving *"Game-ulation"*!



Combining the best features of a fast and furious racing game with the realism of an accurate driving simulator. Work your way up through the leagues, buy extra features and faster cars, to become the Saloon Car Racing Driver of the Year.

Game Plot

You are an amateur racing driver just starting in the field. You race at weekends during the summer, and have a full time job at the office all week* which helps to pay some of the gargantuan bills you incur at weekends! You have recently blown your life savings on an Astra GTE and entered a season of races...

With your Astra you compete in class C against the other Astras and, if you prove yourself worthy by working your way up through the league, you may eventually manage to get sponsorship to race in class B. At this point you will need to buy a BMW M3, built to your exact specifications and the manufacturer's custom price. After a few more seasons you may even reach the exalted heights of a Cosworth Sierra...

*It is beyond the scope of this program to provide a realistic simulation of a full time office job!

Dynamics



The mathematical simulation of the dynamics of a car in motion was set up by a professional physicist. A Classical Newtonian model is used for the transmission and to model the motion of the wheels on the road in both regimes of sliding. The result of all this is a program realistic enough to allow front, rear and four wheel slides, Understeer and Oversteer and of course handbrake turns.

Graphics

The game features 256 colour, mode 13 graphics, designed by a professional artist. The view is a first person, cockpit view from which you can see the road ahead, the rear view mirror and the instruments. The main view features totally customised handwritten ARM code graphics routines which were necessary to maintain the superb frame rate and create a view previously undreamed of. The courses (Silverstone & Brands Hatch) feature bridges, stands, gravel traps, barriers, the pit lane, and even the man with the chequered flag. Of course there are many other features, but we think it's better to save most of them to be a surprise!

Technical Information

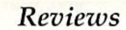
Frame Rate	*Up to 25 FPS*
Object Code	*250k of Handwritten Arm Code*
Graphics	*256 colour, mode 13 graphics*
	Handwritten, custom graphics routines
Sound	*Digitally sampled sound effects (Naturally!)*
Computer	*Any Archimedes with 1Mbyte or more*
Inputs	*Mouse, Keyboard or Joystick*
Serial Link	*This option will be supplied on a separate disc*



SILVERSTONE

BBC A3000 & ARCHIMEDES PRICE £24.95

"Saloon Cars" is compatible with the BBC A3000 and ALL Archimedes computers



Reviews

"The graphics are very impressive - 256 colours with the screen updated at a very fast rate. ....technically Saloon Cars is a breathtaking piece of programming and a stunningly accurate simulation." The Micro User, Sep '91.

"...Saloon Cars uses real-time 3D graphics to produce a game that the Amiga can't hope to match (and so far as PCs are concerned you'd probably need either a 33MHz 386 or even a 486!)....The game features 256 colours (mode 13) and absolutely stunning animation. Make no mistake: the speed and smoothness of this game has to be seen to believed. It's the first simulation I've seen on a computer (i.e. outside of mega-expensive arcade machines loaded with custom chips) that actually feels like you are in a car!" Syracuse, Summer '91.

Reviews

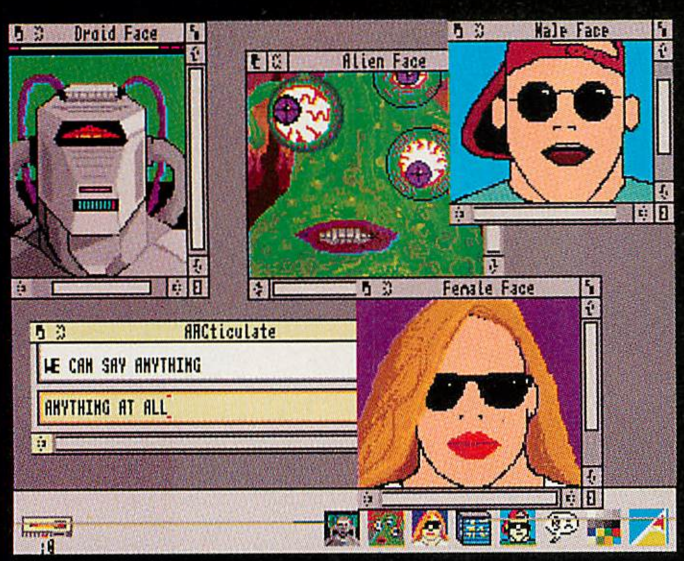
"Once you actually start racing for the first time your jaw will need chiselling off the floor - you cannot help but be astounded at the gameplay.....The cars and courses are realistic down to the millimetre (well, nearly!).....To be honest, I would not have imagined that with the amount that goes on, the display would have scrolled so smoothly. You simply need to see it to believe it!" Club A3000, Summer '91.

"For all you driving and/or racing enthusiasts this is the one you've been waiting for. It's also fine for anyone who just wants a good game." Acorn User, Oct '91.

"...if you are looking for a realistic simulation coupled with a fun arcade game and can't afford the running costs (or repairs) of a Cosworth, then Saloon Cars is a must." Micronet, July '91.

BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

ARCticulate



"The Animated Speech Synthesizer"

This unique and revolutionary speech synthesizer actually has faces that talk to you and to each other. You can choose from 4 main faces and voices - male, female, alien or droid - thereby truly bringing your computer to life!

ARCticulate works in the desktop environment allowing full multi-tasking with word processors etc.. ARCticulate will read any documents that you have written or you can insert jokes, questions etc. etc..

You can alter the pitch, speed, volume and of course voice, during and after any sentence, thus allowing the faces to even talk to each other. The Dictionary supplied is a RISCOS application and is simplicity itself to use. It holds up to 600 words in any file and you can have as many files as you wish - ideal for specialist subjects.

Also included in the package are a selection of jokes, some amusing noises to attach to desktop events, a provisional dictionary file and a superb demonstration program showing you just how articulate Arcticulate is!

FACTFILE

- 4 animated faces able to cover all mouth positions
- 4 meticulously sampled voices which can say absolutely anything you want
- All faces and voices can be installed together
- An individual face and voice can be installed in less than 120K
- Very easy to use dictionary application with up to 600 words per file and limitless files
- Reads text files, word processor documents and can be easily used with your own programs
- Entertaining Joke program, Demo program and Funny Noises program also included

"...ARCticulate produces clearer and more natural speech than any of its rivals. It also has talking heads." Archive, Sep '91.

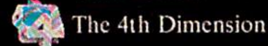
"...the actual quality of the speech is excellent - I have never heard computerised speech sound so real.... The male and female voices actually sound like real people....ARCticulate is a fun program, and demonstrates high quality speech on the Archimedes." Syracuse, Summer '91.

BBC A3000 & ARCHIMEDES PRICE £24.95

ARCticulate is compatible with ALL Archimedes computers

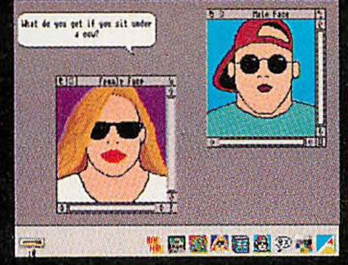
ARCticulate



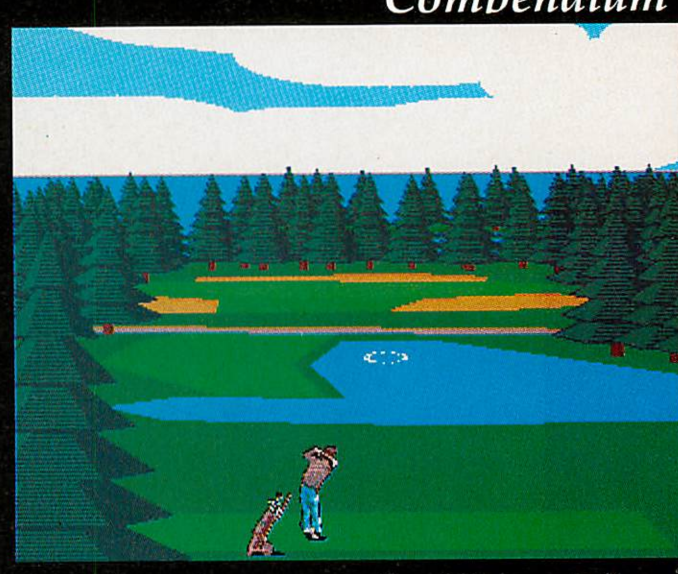








Holed Out
Compendium



"An Immensely Playable Golf Game for 1-6 Players"

Includes: The Original Holed Out

This superbly enhanced version really shows the power of the Archimedes at its best. The game is completely mouse driven and features atmospheric digitised sound effects to convince you that you are really playing golf.

- 1 to 6 players. • 2 contrasting 18 hole courses.
- 4 skill levels for beginner to professional. Learn to play without worrying about the wind, bunkers or rough.
- Realistic ball flight paths. • Slice and hook capabilities.
- Variable wind on each hole - every round is unique.
- Full set of 14 clubs with accurately defined performances. You must consider your lie, the distance required, the wind conditions, the height required and the degree to which the ball will bounce and run along the ground.
- Bunkers, trees, water and variable rough.
- Constantly updated full scoreboard. • Matchplay or strokeplay options.

"I play golf and this game is the closest thing to the real game on a computer. The graphics are very good with a large scale golfer complete with bag and trolley (and a good swing!) and the sounds are very realistic." ARCHIVE, June'89.

".....a great game." The Micro User, August, '89.

& The Holed Extra Courses 1 & 2

These feature 4 extra 18 hole courses which have been meticulously created to test your golfing skills to the limit.

& The Holed Out Designer

Create your own courses with this easy to use yet highly sophisticated hole designer. Its flexibility allows you to define all aspects of the holes from their pars to the size, shape and position of the holes.

"The Holed Out Designer is very easy to use and it makes a perfect complement to the original game." The Micro User, Jan'90.

BBC A3000 & ARCHIMEDES PRICE £24.95

The Holed Out Compendium is compatible with ALL Archimedes computers



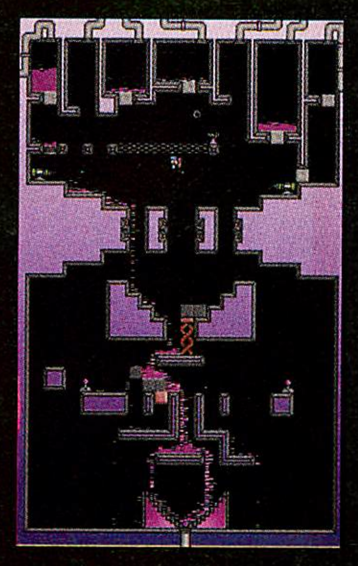




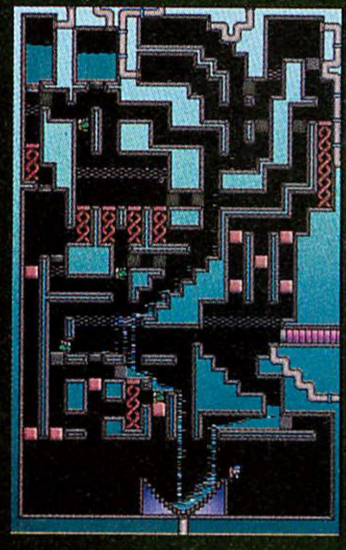


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Cataclysm







"A Stunningly Original and Watery Game!"

Scenario

Unable to escape the gravitational pull of a truly massive planet, the cosmic exploration ship hurtles ever nearer to the planet's surface. The moment of impact fails to happen. Horrendous creaking sounds, and the faintly audible sound of running water provide sufficient evidence to enable the ship's supervisor to eventually grasp the situation. Submerged beneath a vast and alien ocean, the *Orcna* is gradually disintegrating...

Game

Playing the part of the ship's supervisor, your task is to expel water from different sections of the ship via hydraulic pumps, to give the ship's semi-organic outer shell time to repair itself. The water enters each section through a network of pressure-relieving pipes, and must be directed towards a collecting vessel using several manipulating blocks. This must be accomplished within a time limit, before the pressure becomes too great.

The various sections of the ship contain numerous features to further complicate your task. Pressure valves, dissolving blocks and filters all affect the flow of the water. Additionally, the water's presence has disrupted the ship's computer, which is now intent on terminating your existence using the on board weapons' systems, although it is possible to acquire fire power of your own.

As the *Orcna* is an exploration ship, it contains many strange alien life forms, gathered from distant galaxies. The now chaotic computer has taken upon itself to release these creatures from their confining cells, and the aliens are rampaging freely throughout the ship. Needless to say, several of these species are particularly unpleasant. Your task is to prevent the disaster that would occur were the *Orcna* to succumb to the icy water that is flooding into the ship. Your task is to prevent a cataclysm.

Program

Cataclysm is a stunningly original and unique game. As well as incorporating conventional sprite and pixel plotting techniques, a cellular automata is employed to generate realistic fluid motion. A simple set of rules is applied to each individual droplet of water, with hundreds of droplets forming a dynamic fluid which flows around the various on-screen objects. The water will adopt the shape of any container, and even exhibit tiny air bubbles. Later levels incorporate extended fluid routines to create frothing acid, and coloured liquids that mix on contact. Optimised sprite routines allow the presence of various aliens and over one hundred parabolic particles and bullets, all moving extremely smoothly at a high frame update rate.

Guiding the water through the various features and into the collecting vessel requires logical thought, coupled with arcade reflexes. Cataclysm successfully combines both puzzle solving and shoot'em up elements to create an immensely playable and enjoyable game.

Technical Specifications

50 Hertz cellular automata generates realistic fluid motion.

Over 1000 individual droplets of water on screen simultaneously.

Water, sprites and over a hundred independent particles and bullets updated at 50 frames/second.

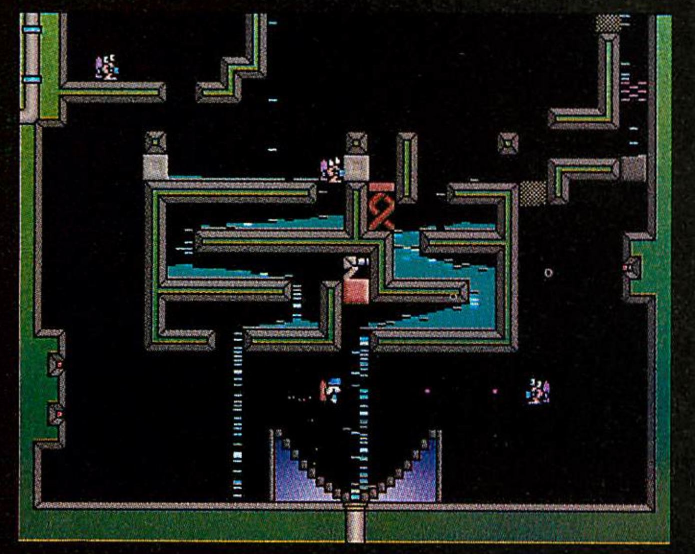
256 colour graphics, 320*640 pixel playing area with superbly smooth animation and scrolling.

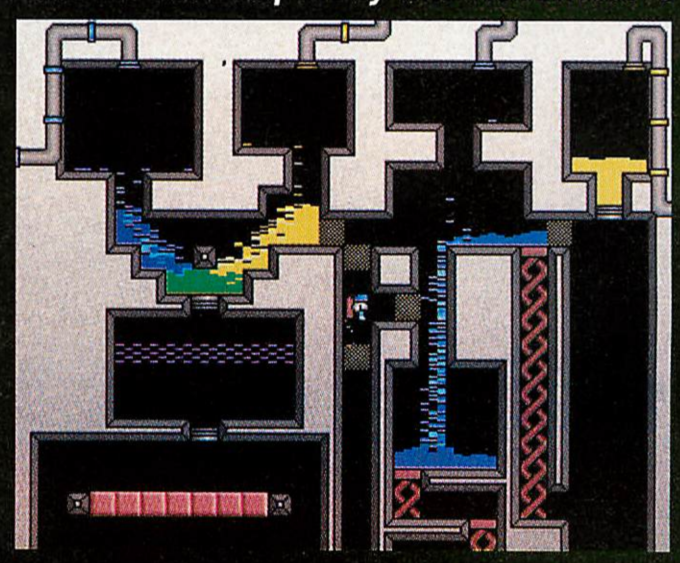
Over 500k of superb sampled music and sound effects.

40 increasingly complex and difficult levels.

Numerous features including valves, dissolving blocks, remote control doors, drip-valves, linear and parabolic guns, increasingly available fire power, various types of aliens, acid, coloured liquids, guided bullets etc...

BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully late November '91







Boogie Buggy



"The All-Time Classic Car The All-Time Classic Game"

The "E-Type Compendium" includes:

The Original E-Type

Take control of £70,000's worth of gleaming "E-Type" and head off for the drive of a lifetime. Hear the digitised roar of the 5.3 litre 12 cylinder engine as you tear along lanes, roads and motorways at speeds over 150 m.p.h..

"E-Type" takes racing simulations into the world of 32 bit RISC processing to bring you a game of a quality that is not often found even in the arcades.

If you are new to car driving you can take the very easy to drive automatic for a spin but experienced drivers can optimise performance using the faster 5 speed manual.

There are hazards galore in the 5 varied scenarios including other cars, roadworks, pedestrians, trees, rocks, bushes, oil spills and many more.

"On the Archimedes the illusion of speed is terrifyingly real and the way the landscape moves in three-dimensional perspective is a joy - a stunning experience." The Independent, Dec'89.

"This is a superb game....the tracks are fantastic." The Times Dec'89.

"No race game on any other machine looks as good." The Times Educational Supplement Dec'89.

& The E-Type Extra 100 Miles

This consists of 100 extra miles of very hilly and hazardous roads. They will test even the best drivers to the limit.

& The E-Type Designer

This highly advanced but simple to use designer allows you to design your own tracks. It is enormously flexible to produce an endless variety of tracks to challenge you and your friends.

"The perfect complement to E-Type." The Games Machine Feb'90.

BBC A3000 & ARCHIMEDES PRICE £24.95

The E-Type Compendium is compatible with ALL Archimedes computers









"A Totally Original Game with Stunning Animation"

Boogie arrives at Dodge City to find that the Evil Monster Lord has taken control and set about converting power-ore, which is extracted from a mine in the centre of the city, into evil-ore, which he is using to transform all the good in Dodge City into evil. As the Evil Monster Lords' power increases, he proceeds to turn Dodge City into a stronghold for creatures of darkness and other evil monsters, and plots to take control of Bumper World. Boogie has not yet been influenced by the evil-ore and so it is up to him to thwart the Evil Monster Lords' plans.

To do this Boogie must travel across Dodge City counteracting the effect of the evil-ore in each zone by collecting lumps of power-ore, and returning them to the mine. Boogie must also destroy each of the Ore Conversion Plants (O.C.P.'s), before finally meeting the Evil Monster Lord in the Ore Core.

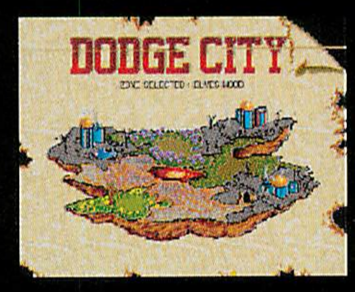
"The first thing you notice about Boogie Buggy is that the graphics are gorgeous. The game uses the border as well as the main playing area by about 40% and the effect is stunning." BBC Acorn User, Sep '91.

"Boogie Buggy sets new heights in presentation, the whole program is a feast for the eyes. Take a look at the lily pond for example, it's breathtakingly good....Boogie Buggy is totally original, packed with action, great sound, catchy music and above all incredible graphics and animation....it's brilliant." Syracuse, Summer '91.

"Coming on three discs, it's certainly a vast game and only just runs on a 1 megabyte machine...Graphics are probably the most pretty and colourful I have seen on an Archimedes, with plenty of plants, flowers and wildlife, all well-drawn in cartoon style artwork...On the whole it's a well thought out and designed game which is addictive too." Micronet, July '91.

BBC A3000 & ARCHIMEDES PRICE £24.95

Boogie Buggy is compatible with ALL Archimedes computers





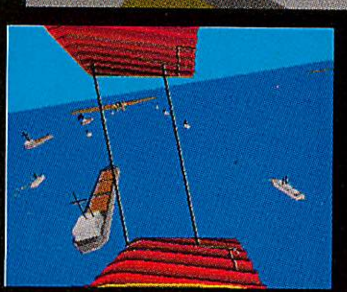




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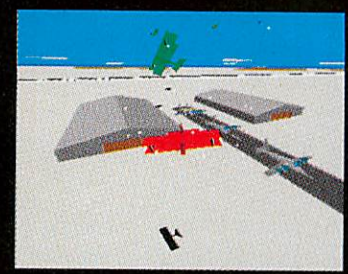
Chocks Away EXTRA MISSIONS











CHOCKS AWAY

This new upgraded Mark II Chocks Away with supersmooth animation really is flight simulation the way you've always wanted it. It has everything for the beginner and the expert:

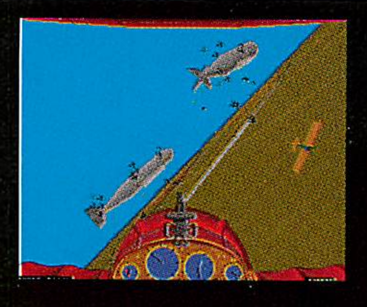
*Beautiful 256 colour graphics and 'nerve shattering' digitised sound effects
*Easy to fly, yet highly manoeuvrable bi-plane - ideal for all ages/ skill levels
***Revolutionary 2 Player Option** using split screen display. This allows 2 players to each fly their own planes simultaneously in practice, dogfights or missions
*Full joystick, dual joysticks, mouse and keyboard control options
***Amazing "Black Box Flight Recorder"** included so that you can record your own flights and then save and replay them. 90 minutes of totally absorbing pre-recorded training flights are included with the game
*Internal/External views of your plane can be selected from front/ rear/left/right
*Powerful 30mm cannon capable of very rapid fire and long range destruction
*Easy to read instrument panel and simple controls
*3 very varied immense maps to explore - approximately 18000 km^2 in total
*20 fascinating and varied missions of increasing complexity are included with a promotion system from Cadet right through to Marshal of the RAF
*Superb range of targets/enemies including bombers, triplanes, fighters, tanks, control towers, anti-aircraft guns, HQs, patrol boats...

CHOCKS AWAY EXTRA MISSIONS

This consists of a new manual and a disc containing an additional 26 missions (6 of which are reconnaissance missions). It is loosely based on the original Chocks Away and features an extensive range of extra features and improvements. To run it you will require the MkII version of the original Chocks Away. Extra features include:

*16 new & detailed maps based over land & sea.
*20 enemy planes and 20 enemy targets are included in each mission. Over 1000 extra targets and planes have been carefully defined.
*Considerably improved action on all missions with plenty of targets to shoot at and plenty shooting at you.
*You can view the action from any of the enemy planes or targets and your own control tower at any time even while still controlling your own plane or watching a saved flight. There is a selection of tracking cameras (with adjustable zoom lenses!) around the playing arena. In addition a phantom plane can also be selected to follow the action on any of your black box flight recordings.
*Improved enemy pilots capable of performing loops, rolls, stall turns etc.. All enemy planes are carefully modelled using the same equations controlling your own plane. This ensures both an accurate and fair simulation.
*More enemy planes and targets to shoot including: Three Engine Fighters, Enormous Cargo Planes, Airships, Barrage Balloons, Gun Boats, Oil Tankers, Trains etc..
*Six reconnaissance missions where you are required to take photos of various installations with your new on board camera.
*Improved graphics over the 16 maps including Complex Cities, Houses, Railways, Roads, Rivers, Bridges, Lampposts, Railway Stations, Oil Rigs, Piers, Beachs, etc. to mention but a few. In total over 100 different graphics have been defined.
*Serial Port Link Up option so that you can link up 2 BBC A3000 or Archimedes computers and 2 pilots can fly simultaneously in full screen mode.
*Extensive enemy flak guns and improved enemy plane guns help make the new missions both more interesting and challenging to say the least!
*Improved digitised sound effects plus, of course, all the extensive options which are available with the original Chocks Away.

WIN a Superb ......
"Radio-Controlled Biplane"
Successful completion of all 6 Reconnaissance Missions will allow you to enter this competition
TALLY HO GINGER!









ARCHIMEDES
& BBC A3000
All versions are compatible with the BBC A3000 and ALL Archimedes Computers

CHOCKS AWAY (Mark II Version with 1 or {split screen} 2 player options) £24.95
CHOCKS AWAY EXTRA MISSIONS (With 2 player Serial link option) £19.95
CHOCKS AWAY COMPENDIUM (Chocks Away & the Extra Missions) £39.95
CHOCKS AWAY NETWORK (Econet/Midi etc. - Ring for Availability & Price)

Chocks Away Reviews

Chocks Away Mark I Version was awarded GAME OF THE YEAR 1990 by Acorn User, A&B Computing (now Archimedes World), Risc User & Micronet.
"Graphics in the game are superb, smooth and with plenty of ground detail.......this is a really enthralling flight simulator with plenty of variation and features to ensure longevity." Risc User, Dec '90.
"Chocks Away is a delightful game." Archive, Jan '91.
"Chocks Away is a brilliant game." BBC Acorn User, Dec '90.
"....it's a really great game. Playability 10. Value 10." The Micro User, Jan '91.
"(Chocks Away Mark II Version).. The increased speed obviously makes the game more responsive and fun to play, well and truly overtaking Interdictor II as the best Archimedes plane game." New Computer Express, Feb '91.

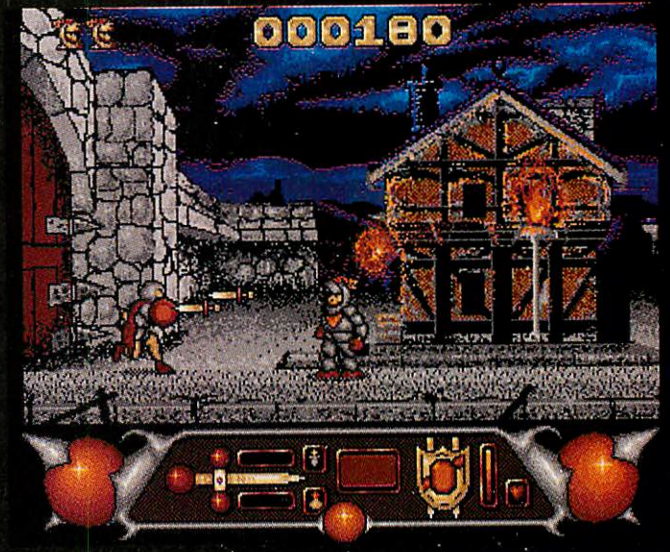
Extra Missions Reviews

"I reckon Chocks Away is probably still the best game available for the Archimedes/A3000." BBC Acorn User, August '91.
"How do you improve on a game that left me rushing for my Thesaurus to describe it? Well, those guys at 4th Dimension have delivered the goods once again, and have somehow managed to improve on the best flight simulation on our humble Arc." Club A3000, Summer '91.
"Chocks Away remains, above all, fun. It doesn't really sacrifice realism, but it also doesn't make controlling the aircraft so complicated that you haven't got time to enjoy the game.." Syracuse, Summer '91.
"If you haven't yet seen this game, the screenshots in the 4th Dimension's latest adverts don't do the game justice, simply rush out and buy it. Beware though, once you've played it once, you'll never have another early night." Micronet, June '91.

BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

Enter The Realm





"A Superfast Adventure into Arcade Action"







Combining fast arcade quality action and graphics with the element of adventure and surprise. Meet strange characters, build up your weapons and eventually meet evil in mortal combat.

The Background

Travel back to Karidor, a land lost in antiquity. A land of evil, a land of good. A land where almost anything can happen and probably will. A land of magic and a land of beauty. So your quest begins.....

The land of Karidor was a quiet world much like Earth. It had mountains, it had seas. It had forests and it had deserts. Even the people were similar, but one thing was different. This was the fact that magic did exist there.

For many aeons the land was untroubled by any great power until one fateful day where everything changed and evil took control. Evil had always existed of course, but had been in balance with the good of the gods, who were neutral. That day however, the balance was tipped.

It turned out that the ancient prophecies of Karidor had proclaimed this event thousands of years ago. The prophecy stated that evil would overthrow the Realm and only one man, a knight of goodly heart and fearsome ability could reset the balance again. The knight was named Kharas.

Enter the Realm challenges you to lead Kharas in his conquest against evil. On the way, dangers will befall you and surprises will await you...

The Game Design

Enter the Realm is the first game to feature true parallax scrolling on the Archimedes and A3000 computers. The whole play area is created from layers which slide over each other creating a true 3 dimensional backdrop upon which the game proceeds.

The game features fast spectacular graphics which are all hand drawn and realistic digitised sound effects and speech which are totally interactive with the action all around you. Everything else in the game will be left as a suprise!

Specifications

Over 2 megs of high quality realistic graphics, all hand drawn.
Over 130k of in-game digitised sound effects and speech.
Over 150k of music by Peter Gillet.
50 frames per second arcade quality scrolling, animation and movement.
6 layer FULL parallax scrolling of play area (forget immitations!).
Massive sprites.
Realistic weather effects and intelligent adversaries.
Control via keyboard or RTFM joystick.









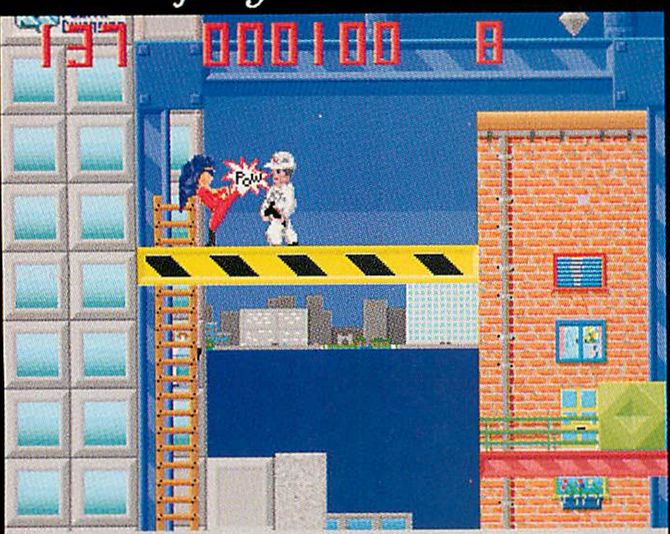
BBC A3000 & ARCHIMEDES PRICE £24.95

Enter The Realm is compatible with the BBC A3000 and ALL Archimedes computers



BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

The Exotic Adventures of Sylvia Lain



"A Young Woman with 9 Lives and a License to Kill"

The Exotic Adventures of Sylvia Lain features 256 colour mode 13 graphics and supersmooth scrolling using six planes of overlapped parallax with a frame rate of 50 Hertz. The player controls a highly dextrous young woman who can jump, somersault, roll, kick, punch and more. Over 50 frames of animation in each direction are used on Sylvia alone.

Game Outline

Your mission will take you from the latest construction sights of New York to the ancient temples of the Aztecs in South America. After some magic moments you will be whisked on to the Kennedy Space Centre and finally to the B.E.N. Headquarters hidden in a giant oil refinery somewhere in the Middle East. The gameplay is a carefully blended mixture of puzzle solving, arcade adventure, beat'em up and humour.

Mission Brief

The Nobel prize winner, Prof. Doughnut, was abducted yesterday only minutes before he was due to give his historic speech explaining his solution to the world's energy problems. It is believed that the professor has achieved room temperature fusion using the highly unstable elements found only in camel dung. However the exact formula has disappeared with the Prof. We believe that his abductors were none other than B.E.N..

Sources have reported that during the struggle, pages from the scientist's notes were left behind. Your mission is to recover all the scattered pages of the Professor's Notes. Not only will these pages provide clues to the missing formula but the cunning academic has managed to scribble maps on each of the pages giving clues to his next location.

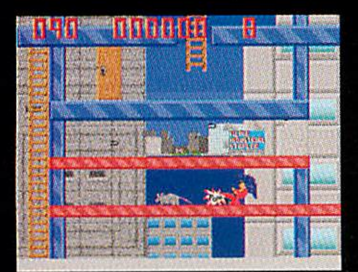
The professor was taken from outside the science faculty in New York. You will therefore be transported there immediately by an Ecologically friendly blimp. You will start your mission by recovering the lost pages at this location. Unfortunately our agents report that B.E.N. already have operatives working there. You are therefore licensed to kill and should use any means necessary, short of damaging the environment, to retrieve the missing papers and hopefully rescue the professor.

BBC A3000 & ARCHIMEDES PRICE £24.95

Release date hopefully mid Nov '91









Drop Ship



"Supersmooth Superfast Pure Arcade Action"

Drop Ship is one of the smoothest and fastest arcade games you are likely to see. It features superb 256 colour graphics, 15 increasingly large and diverse stages and an excellent stereo soundtrack.

The Year is 2020....The government proudly announces that the new fast breeder farm on the Mars colony is completely computer managed and totally safe, defended from attack at all times by a fully-automated tactical defence system.

The Year is 2030....Earth receives a transmission from the Mars colony. The radiation seems to have affected the management software at the fast breeder farm. The defence systems have gone haywire and the whole farm is rapidly approaching meltdown. If all the reactors are not shut down the Mars colony will be wiped out.

The defences include gun emplacements, artificial gravity generators, sporers and hoards of deadly aliens. What is needed is a craft which is supremely manoeuvrable, capable of great speed and possessing awesome fire power, and a pilot of extraordinary bravery to fly it. The craft is the Drop Ship. The pilot is you.

Specifications

256 colour mode 13 graphics.
Frame Rate: 50 frames per second.
Maximum objects on screen: 150 per frame.
The ship movement in the game is accurate down to 0.0001 of a pixel.

"A brilliantly addictive game which really makes you want to barricade yourself into a room for a week in order to finish it....The graphics and animation are really superb." BBC Acorn User, Jan '91.

"Compared to both Rotor and Caverns, this game has to be tops. The gameplay is even more difficult than both and the graphics and sound far better." Risc User, Dec' 90.

"Drop Ship is very arcade-like, with excellent graphics, the smoothest movements in town, nice sound effects and a good short demo." Archive, Jan '91.

"To sum up, a game that'll keep you hooked on your machine for many a late night with a cup of Hot Chock." Club A3000, Summer '91.

BBC A3000 & ARCHIMEDES PRICE £19.95

Drop Ship is compatible with ALL Archimedes computers









BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

***SPECIAL OFFER:* If you buy The Real McCoys 1 & 2 directly from us you may deduct £10 from the total cost**

The Real McCoy



"This 4 Game Collection really is The Real McCoy"

U.I.M. (R.R.P. £29.95)
U.I.M. (Ultra Intelligent Machine) is a futuristic action adventure set in the oceans. It is a huge game featuring solid 3 Dimensional graphics and digitised sound effects. You must travel the oceans in your highly expandable submarine visiting the enumerous ports throughout the ocean networks. As well as gaining combat skills you'll need to learn to trade in commodities, shares and currencies. There are over 250 missions to complete before you will find your goal - the U.I.M. - created to be almost a god.
"U.I.M. is a powerful game that justifies its higher price tag through guaranteed longer life." The Micro User

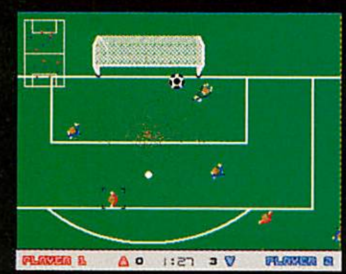
ARCADE SOCCER (R.R.P. £19.95)
Arcade Soccer really is World Cup Football action at its very best. Using an overhead view to make gameplay as exciting as possible it features everything that you could want in a football game. Corners, throw-ins, goal kicks, dribbling, shooting, passing and much more. The superb graphics and smoothly scrolling pitch are complemented by a multitude of excellent digitised sound effects and music. Furthermore Arcade Soccer is packed with options catering for up to 24 players, weather conditions, friendlies, accurate full World Cup simulation and replays to mention but a few.
"This game is excellent.... I'm not really a soccer buff, but I thoroughly enjoyed this desktop version. The micro-controlled players behave in an amazingly realistic manner." The Micro User

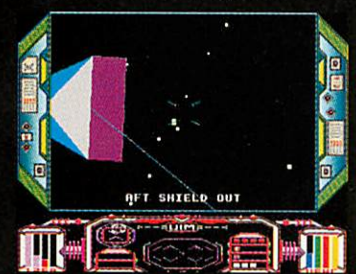
WHITE MAGIC (R.R.P. £19.95)
White Magic is a unique arcade adventure in which you control 4 varied adventurers: a Leprechaun, a Titan, a Warrior and an Enchanter. You can transform between all 4 characters at will and use their much needed special abilities. It features 32 massive action-packed levels filled with aggressive guards and trolls, haunting ghosts and spectres, curious objects to use and find, and much more. White Magic is not a game for the faint-hearted; it is a fast action game which requires fierce hand-to-hand combat and frantic weapon fire.
"Playability is good and I had to tear myself away in order to write this update review." The Micro User

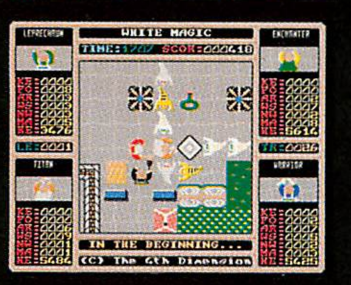
QUAZER (R.R.P. £11.95)
Quazer is a fast action arcade style game with excellent music, sound effects and graphics. It has 11 incredibly detailed and varied vertically scrolling levels filled with the most amazing assortment of baddies you are ever likely to see. Quazer is classic arcade action and will test even the most competent games player to the limit.
"The power of the Archimedes is used to produce some stunning effects..." The Micro User

BBC A3000 & ARCHIMEDES PRICE £29.95

The Real McCoy is compatible with ALL Archimedes computers









The Real McCoy 2



"This 4 Game Collection really is The Real McCoy too!"

APOCALYPSE (R.R.P. £29.95)
Apocalypse places you on the surfaces of 9 varied futuristic hostile planets colonised by very varied but always ruthless enemies. In your highly advanced and extremely fast and manoeuvrable craft you must find your way around the increasingly massive planets and systematically annihilate the enemy.
"Simply, this is the best release yet for the Arc by absolutely miles. Stunning graphics, stunning sound and masses of action. Brilliant."....Risc User

HOLED OUT (R.R.P. £19.95)
Whether you're young or old, male or female, beginner or professional Holed Out has been designed especially for you. Features include: 2 contrasting courses, 1 to 6 players, excellent 3D graphics and sound effects, full set of accurately defined clubs, slice/hook capabilities etc. etc..
"...I play golf and this is the nearest thing I've seen to the real game on a computer. The graphics are very good with a large scale golfer complete with bag and trolley (and a good swing!) and the sounds are very realistic."....Archive
"...it is quite a stunning piece of work."....The Micro User

THE OLYMPICS (R.R.P. £19.95)
The Olympics can be played by 1 to 8 players and is comprised of 6 main events: Diving, Shooting, Javelin, Swimming, Canoeing and Pole Vault. It contains a superb piece of music, opening and closing ceremonies and 14 national anthems.
"Compilation packages of sporting events may have been round on other machines for ages but the first one for the Arc is every bit as good .... VERDICT: A Gold Medallist."....A&B Computing (Now Archimedes World)
"Excellent graphics .... Classy presentation .... and plenty of variety .... Should find favour with all members of the family. Definitely recommended.".... Risc User

INERTIA (R.R.P. £19.95)
Inertia is a totally original game with beautiful graphics and superb digitised sound effects and music. There are 2 massive and varied landscapes to be explored and many special tiles to be collected. Your craft floats freely around the landscapes and you must exert forces upon it to guide its speed and direction. Full colour 3 dimensional maps of the 2 landscapes can be viewed at any time and are a joy just to wander around.
".... the accompanying music is superb .... Inertia is another reasonably priced game for all ages. Highly recommended."....The Micro User

BBC A3000 & ARCHIMEDES PRICE £29.95

The Real McCoy 2 is compatible with ALL Archimedes computers



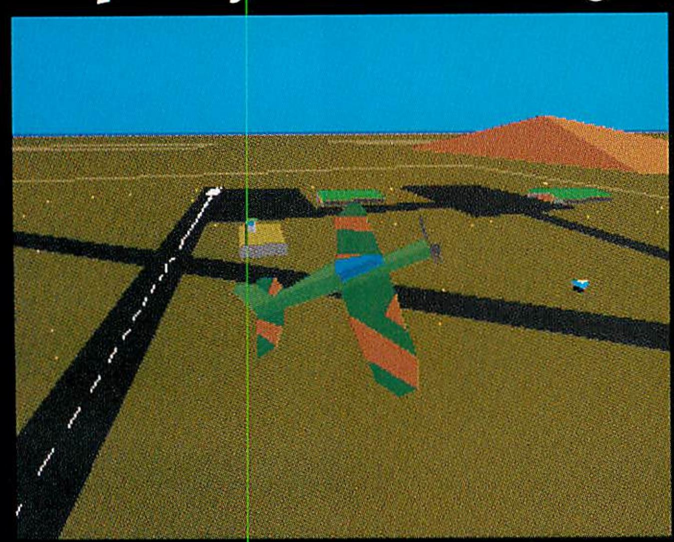






BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

Spitfire Fury



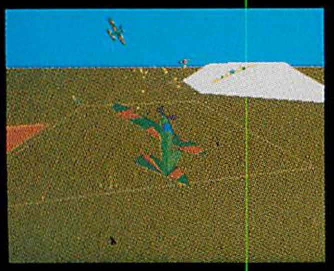
"A Superfast, Action-Packed, Fun & Accurate Simulation"

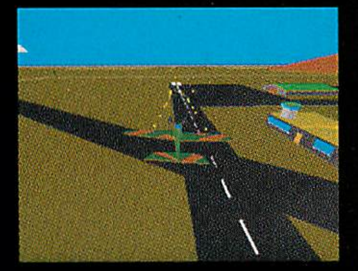
Spitfire Fury is the latest flight simulation game created by Andrew Hutchings (the author of both the Chocks Away games). In this action-filled game you take the controls of the most famous World War II fighter plane and have to tackle a range of challenging missions and tasks. The game has been designed to be an action-packed, superfast and accurate simulation with lots of fun to appeal both to the beginner and the expert.

- Superfast screen update, 12 to 18 frames per second.
- Two player option using split screen or two computer serial link.
- Computer-controlled planes fighting alongside you against the common enemy.
- Lots of varied and **action-filled** missions with over 100 enemy targets to destroy in certain cases. Such as Escorting Bombers, Bombing Raids, Torpedo Attacks on Gun Boats, Solo and Accompanied Missions, etc.. Plus of course a range of practice missions to help you get the hang of landings etc..
- Save and load game options are provided allowing you to save the game onto disk at any point and return to it later.
- A **Super Accurate** model of the plane has been created taking into account wind speed, airspeed over all control surfaces, gravity, drag and lift of each control surface etc.. This makes the plane capable of performing realistic stunts such as spins, which has not yet been seen on ANY previous Archimedes flight simulations.
- Full interaction between all planes, bullets, hills, valleys, buildings etc. This means you can seek cover by flying close to hills, buildings etc. and the enemy planes (and your fellow Spitfires) can make mistakes and shoot each other or crash into obstacles.
- 256 colour graphics, digitised sound effects and complex scenery over huge expanses of land including cities, rivers, roads, hills, valleys, railways, boats, etc.
- A huge selection of viewpoints and tracking cameras are provided for you to view the action from. Plus entire flights can be recorded and watched later from any angle.

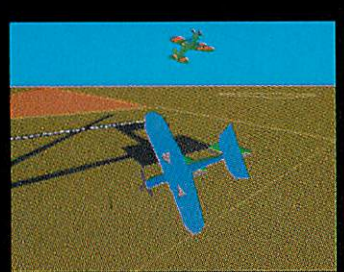
Please note that the screen shots shown are of a very early development version and therefore do not illustrate the graphics which will be included in the final version. Look out for the adverts around the release date for screen shots of the final version.

BBC A3000 & ARCHIMEDES PRICE t.b.a.
Release date hopefully February '92









X-Fire



"Highly Addictive Classic Arcade Action"

X-Fire is an exciting new arcade game which represents a welcome return to traditional arcade values.

Pit your wits and reflexes against hordes of menacing aliens within a high tec battle arena. At your disposal is an awesome array of fire power that is all that stands between you and certain destruction. Both cunning and dexterity will be required to prevail against increasingly sophisticated and dangerous opponents.

Collect bonuses to aid you in your task and augment your ship's capabilities. Regen Bombs, Split Bombs, Shield Reserves and Zaps are just a few of the bonuses available.

With crisp graphics and addictive arcade action, X-Fire combines the best qualities of classic arcade games with the advanced audio and visual capabilities of the Archimedes to create the ultimate high speed shoot'em up.

Specifications

256 colour MODE 13 graphics
Highly optimised custom graphic routines
Up to 200 objects on screen
Over 300k of high quality sampled sound

X-Fire is an essential purchase for any serious game player in search of a lasting challenge.

BBC A3000 & ARCHIMEDES PRICE £24.95
Release date hopefully mid Nov '91









BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

Pandora's Box





"State of The Art Arcade Adventure"

An intriguing blend of classic puzzles and full-blooded arcade action. Over 200 screens of stunning artwork and game play of the highest quality will appeal to the dedicated adventurer or arcade fanatic.

Prologue

Since ancient times a fastened box has symbolised the danger of our curiosity. This box has been opened and an entire kingdom has been poisoned by the evils unleashed.

The beast that lurked within is free and seeks the souls of men, possessing them and devouring them at will. Feeding upon misery, it profits by treachery and corruption, and in doing so brings the burden of its evils upon the land.

As the finest sorceror in the kingdom you must overcome the black magic and confine the curse once again to the only dungeon strong enough to contain such furious depravity - Pandora's Box.

Quest

The powerful Panmetric graphics system allows you explore complex rooms and stunning landscapes whilst still having plenty in reserve to handle frenzied battles.

At first only armed with a keen wit you must acquire knowledge and magical weapons as the adventure gives way to arcade action. Exploring the length and breadth of the land you could conquer a world of magic or die in obscurity.

Technical Information

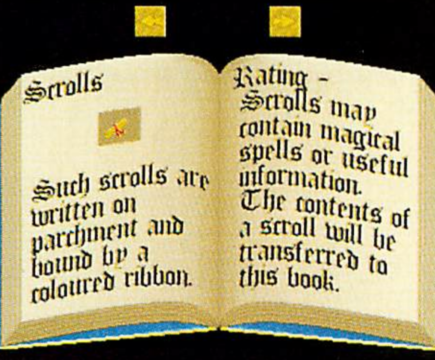
Frame Rate	25 FPS
Object Code	150k of Handwritten Arm Code
Graphics	Over 1000 sprites totalling 3Mb of graphics 256 colour, mode 13 graphics Panmetric graphics system
Sound	Digitally sampled sound effects
Computer	Any Archimedes with 1Mb or more

BBC A3000 & Archimedes Price: £24.95











Roll of Honour

Rank	Name	Score	Done
Mayor	Merlin	2500	25%
Yeoman	Pandora	1500	15%
Beggar	Robert	1000	10%
Tramp	Zippy	500	5%
Leper	Gordon	0	0%

Awarded by

Arthur Rex



"Anybody can be an Artist with ARCtist"

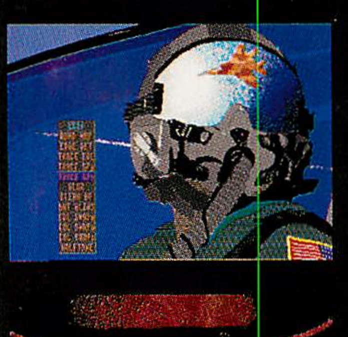
This superb painting program has been designed to be incredibly easy to use and yet totally jam packed with features. Developed with help from educational specialists and professional graphic artists, ARCtist is ideally suited to home, school and professional users.

Just a few of ARCtist's features include:

- Full screen 256 colour mode 15 editing. RISC OS compatible.
- Intelligent spray gun that 'shades' rather than just plotting random dots of colour.
- Rotation up to 2870% faster than !Paint.
- Internal handling of up to 30 sprites with auto sprite naming, sorting, grabbing, cutting, instant masking, rotation, scaling etc..
- Masking tape option lets you mask any part of the screen for spray gun work, then lift off later to reveal what was underneath.
- Zoom around the screen at high speed and edit with pixel accuracy.
- Several brush types available with variable size.
- Undo option undoes the last change you made to a drawing, in case of mistakes.
- Special effects to distort, detect edges, trace with colours, trace with sprites, swap colours, dither colours, blur, anti alias etc. etc..
- Special proportionally spaced outline fonts that don't require any memory in the font cache. Put a rectangle around the area you want the text to fit and ARCtist will scale it to fit.
- Rectangle copy, move, rotate and scale. Also, accurate shape cut copy, move, rotate and scale tools to slice out the exact part of the screen you want.
- Sprite animation with built insequence editor, offset generator & flight path editor.
- Load, edit and save fill pattern files. ARCtist fill patterns are twice the size of normal ones.
- Two user definable drawing brushes, can be defined directly or grabbed from anywhere on the screen.
- Several hundred Kbytes of clip art included.

BBC A3000 & ARCHIMEDES PRICE £24.95

ARCtist is compatible with ALL Archimedes computers

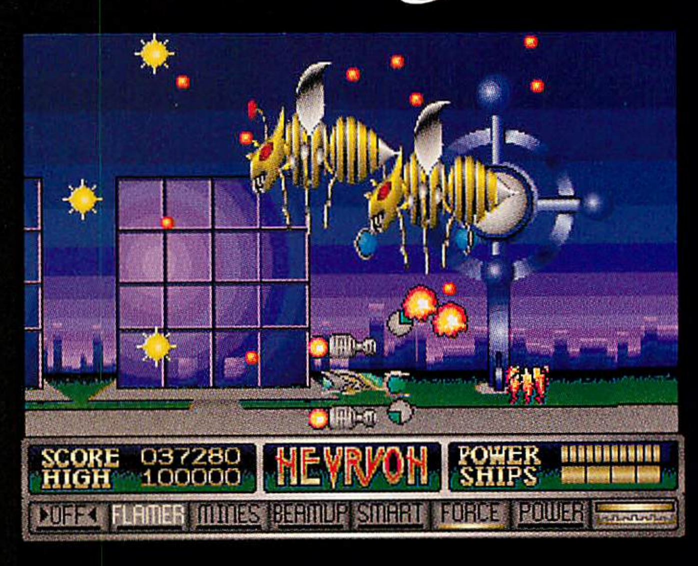








Nevryon



"A Superlative Action-Packed Arcade Game"

During The First Great Space War of 2100 reserves of titanium, the chief metallic element involved in ship construction, begins to run out throughout the known universe. Only the human-colonised planet - Nevryon - has large reserves. You must destroy all alien forces which are attempting to take over Nevryon.

To succeed you must complete 4 very different missions: destroy the alien bases on the Surface and in the Caves of Nevryon, plus destroy from within both the Alien Battlecruiser and the huge Alien Beast. The aliens will attempt to attack and confuse you with every type of vessel they possess.

You begin each mission with a standard short range V5 Fighter. Anything larger would undoubtedly mean detection and death before you could even begin. However, once in the thick of the action, your fighter is able to collect and use a large array of extra weaponry and shielding. You will be on your own but you will not be forgotten....

Specifications

Over 1.5 Megs of 256 Colour Mode 13 Graphics. Over 60 Objects On Screen at Once
25 Frames/Second Scrolling and Animation. 6 Levels of True Parallax Scrolling
Big Sprites. 4 Channel Sound Played at 20kHz
6 Pieces of Superb Stereo Music. Multi-Channel 'Live' Stereo Sound

"Fans of strategy games won't like this one, but for the masses who enjoy total alien genocide, dushdi graphics and equally appealing sound, this game must surely be worth a mention on your list to Santa. I wholeheartedly recommend this game as the definite shoot'em up for the Arc..." Club A3000, Summer '91.

"Nevryon features the best graphics and sound I have ever come across. All of the superb sprites are packed with amazing detail and the animation and scrolling are completely flicker-free." Micro User, Nov '90.

"The 4th Dimension have come up trumps with another classic...Graphics are superb...The number of animated objects, missiles, scenery and details will put many ST and Amiga to shame with the sheer power of the ARM chip." Micronet, Aug '90.

BBC A3000 & ARCHIMEDES PRICE £19.95

Nevryon is compatible with ALL Archimedes computers







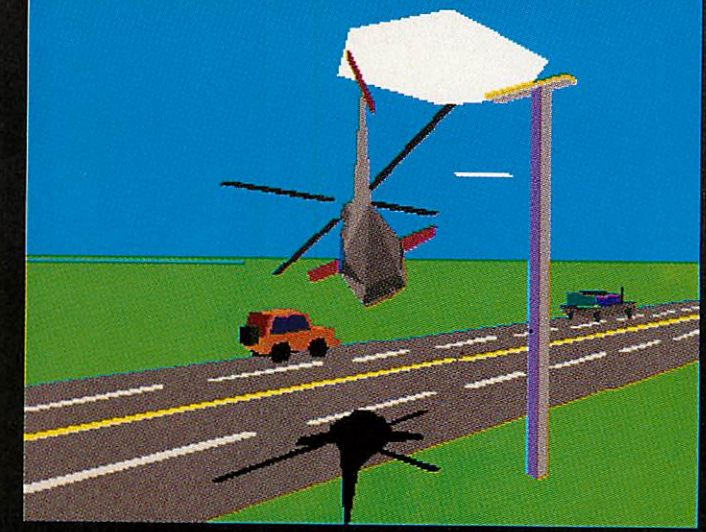




BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES / BBC A3000 / ARCHIMEDES

Chopper Force





"Superfast Action-Packed Chopper Sim"

Gameplay

The year is 2023 and advanced weapons' systems such as laser-guided munitions and stealth technology has fallen into the hands of a terrorist organisation.

You pilot a highly advanced helicopter on a number of varied and increasingly challenging missions to attack the terrorists, 'accompanied' by NEXT GENERATION uncannily realistic 3D graphics.

Hardened flight simulator addicts who may no longer find it challenging to pilot a plane will just love learning how to master the controls of the advanced and highly manoeuvrable military helicopter in Chopper Force. And in 2023 there are new super high technology 'smart' weapons to be mastered!

In Chopper Force there are missions that you could never dream of attempting in a plane simulator - such as picking up military hardware with a rope and transporting it to where it is needed as quickly as possible or conveying important intelligence information from the top of a skyscraper in one city to where it is vitally needed in a neighbouring city.

Experience a feeling of total power by hovering a safe distance from a convoy supplying the terrorists and picking them off from a safe distance with your smart missiles. Knock out communication lines going into and out of their HQ to totally cut them off. You will come across their own advanced helicopters, jets, tanks, laser-guided missiles, the dreaded flak, etc..

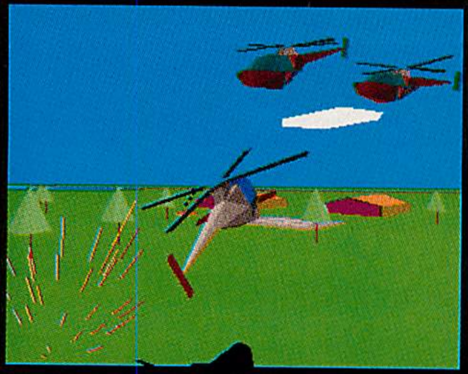
The final highly tasking mission involves attacking the enemy HQ to totally annihilate the terrorists.

If you can get this far then you are truly worthy of the Chopper Force.

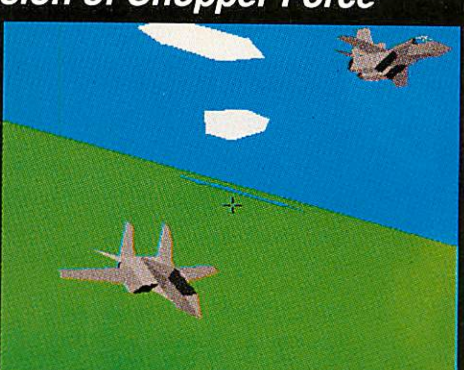
Specifications

Graphics: 256 colour mode 13 graphics
Frame Rate: Up to 25 frames per second
Polygons per frame: Up to 500
Polygons per object: Up to 80

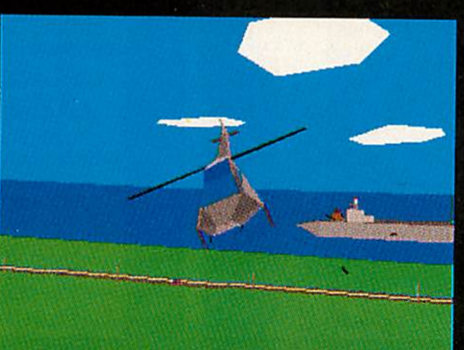
BBC A3000 & ARCHIMEDES PRICE t.b.a. Release date hopefully March '92
The screenshots shown were taken from a young version of Chopper Force













The Fourth Dimension

SPECIAL OFFER: If you buy 3 or more products directly from us you may deduct £10 from the total cost


Chopper Force (early version)



Enter The Realm


Saloon Cars

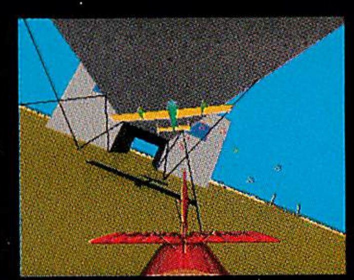

The Exotic Adventures of Sylvia Lain



Pandora's Box


Break 147 & Superpool


Grievous Bodily 'ARM


Chocks Away Extra Missions

ACORN BBC A3000 & ARCHIMEDES SOFTWARE

The following software is compatible with the BBC A3000 and ALL Archimedes computers

ARCADE GAMES

Grievous Bodily 'ARM	*(Hopefully late Nov.'91)*	24.95
Cataclysm	*(Hopefully late November '91)*	24.95
X-Fire	*(Hopefully mid November '91)*	24.95
Boogie Buggy	*(Arcade Graphics & Gameplay)*	24.95
Nevryon	*(Unbelievable Graphics & Gameplay)*	19.95
Inertia	*(Isometric Arcade Action)*	19.95
Apocalypse	*(3D Mega Game - 9 Planets)*	29.95
Drop Ship	*(Superfast Arcade Action)*	19.95
Arcade Soccer	*(World Cup 1-24 Players)*	19.95
The Olympics	*(6 Varied Events - 1-6 Players)*	19.95
Quazer	*(Furious Arcade Action)*	11.95

EDUCATIONAL SOFTWARE
(from Triple 'R' Education)

Picture Book	19.95
Money Matters	19.95
Data Word	19.95
Target Maths	19.95
Converta-Key	19.95

3D SIMULATIONS/GAMES

Chopper Force	*(Hopefully March '92)*	t.b.a.
Spitfire Fury	*(Hopefully February '92)*	t.b.a.
Saloon Cars	*(The Ultimate Driving"Game-ulation"!)*	24.95
Break 147 & Superpool	*(Incredibly Realistic Snooker and Pool Simulator)*	24.95
Chocks Away	*(Biplane Sim. for 1 or 2 Players)*	24.95
Chocks Away Extra Missions	*(26 Extra Missions plus some Superb Enhancements)*	19.95
Chocks Away Compendium	*(Chocks Away + Chocks Away Extra Missions)*	39.95
Powerband	*(Superfast Formula 1 Grand Prix)*	24.95
E-Type Compendium	*(3D Classic Car Racing) (E-Type + Extra 100 Miles + Designer)*	24.95
Holed Out Compendium	*(3D Golf 1-6 players) (Holed Out + Extra Courses Vol.s 1 & 2 + Designer)*	24.95

GRAPHIC ADVENTURE

The Wimp Game	*(Unique Graphic Adventure)*	19.95

ARCADE ADVENTURES

The Exotic Adventures of Sylvia Lain	*(Release date hopefully mid November '91)*	24.95
Pandora's Box	*(Stunning Graphics & Gameplay)*	24.95
Enter The Realm	*(Supersmooth Arcade Action)*	24.95
Pysanki	*(Futuristic Arcade Adventure)*	19.95
Man-At-Arms	*(Medieval Arcade Adventure)*	19.95
U.I.M.	*(Massive 3D Action Adventure)*	29.95
White Magic	*(Magical Arcade Adventure)*	19.95
White Magic 2 + Designer		19.95

COMPILATIONS

The Real McCoy	*(4 Game Compilation) (U.I.M., Arcade Soccer, White Magic & Quazer)*	29.95
The Real McCoy 2	*(4 Game Compilation) (Apocalypse, Holed Out, The Olympics & Inertia)*	29.95

SPEECH & ART SOFTWARE

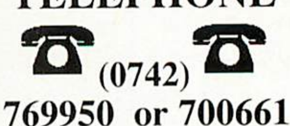
ARCtist	*(Easy to use Professional Art Package)*	24.95
ARCticulate	*(The Animated Speech Synthesizer)*	24.95

BBC MICRO, MASTER, COMPACT & ACORN ELECTRON

Title	BBC B & Electron Cassette	BBC B & Master 5¼" Disc	Master Compact 3½" Disc
Q-Master *(Realistic Pool Game)*	---	14.95	15.95
Picture Book *(Educational Software)*	12.95	14.95	15.95
Money Matters *(Educational Software)*	12.95	14.95	15.95
Data Word *(Educational Software)*	12.95	14.95	15.95
Target Maths *(Educational Software)*	12.95	14.95	15.95
Converta-Key *(Educational Software)*	12.95	14.95	15.95
E-Type *(3D Classic Car Racing)*	9.95	14.95	15.95
Nevryon *(Pure Arcade Action)*	---	14.95	15.95
Inertia *(Isometric Arcade Action)*	9.95	12.95	13.95
U.I.M. *(Massive 3D Action Adventure)*	---	19.95	21.95
Holed Out *(3D Golf for 1 to 4 Players)*	12.95	14.95	15.95
Holed Out Extra Courses Vol.1	9.95	11.95	12.95
Holed Out Extra Courses Vol.2	9.95	11.95	12.95
Arcade Soccer *(Fast Action - 1 or 2 Players)*	9.95	12.95	13.95
White Magic *(Magical Arcade Adventure)*	9.95	12.95	13.95
White Magic 2 + Designer	9.95	12.95	13.95
The Art Studio *(Easy to Use Art Package)*	9.95	12.95	---

HOW TO ORDER

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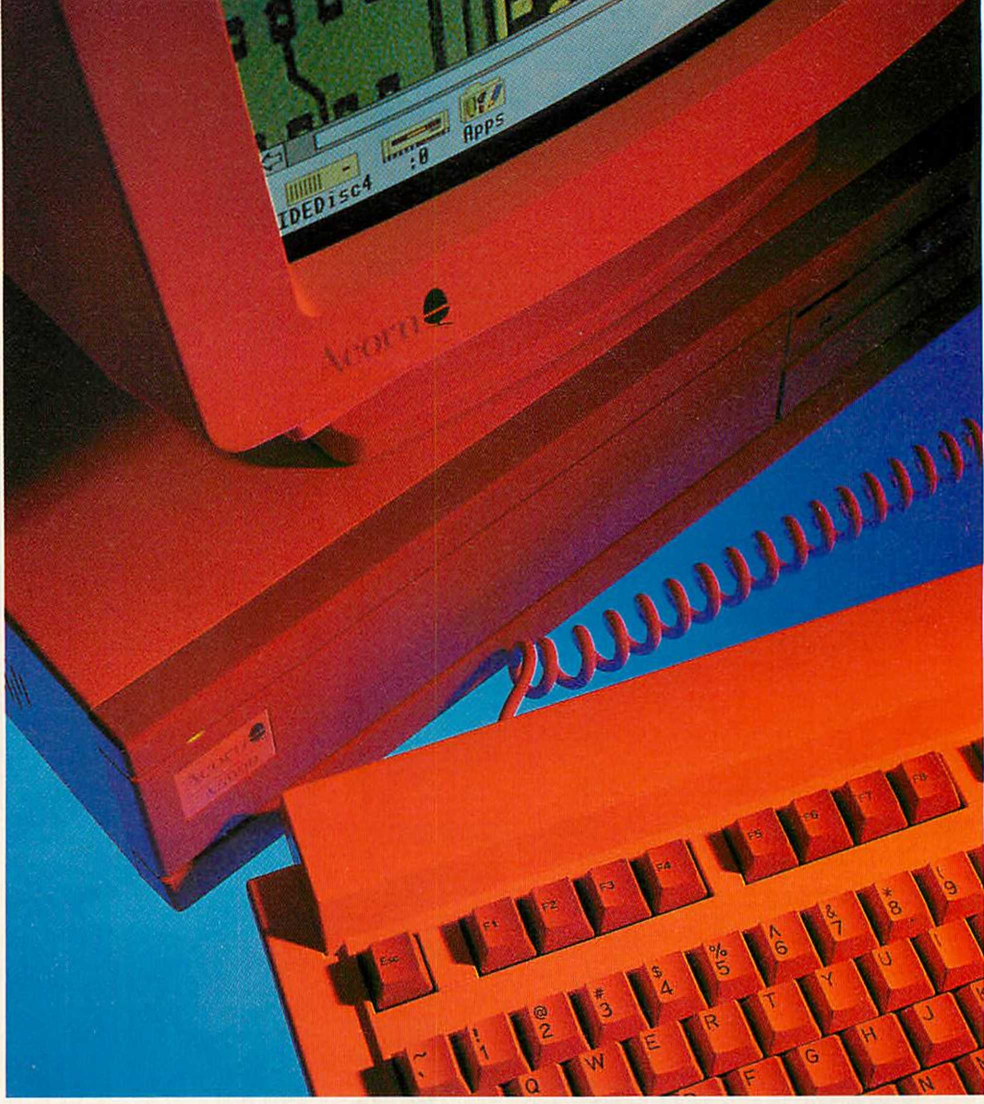
The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU, England.

NO Quibble GUARANTEE

If any of our discs ever become faulty (for whatever reason) we will replace them free of charge immediately. Simply return them to us with your name and address.

A5000 A STEP IN THE RIGHT DIRECTION

GRAHAM BELL takes a close look at the A5000 – probably the most significant Acorn machine yet



PHOTOGRAPHS BY ROBERT CLIFFORD

The recent *BBC Acorn User* Show saw the launch of the latest Acorn Archimedes – the A5000. Judging by the buzz of excitement among visitors (especially those who were queueing to buy one) the new machine is undoubtedly the biggest leap forward for Acorn since the introduction of the Archimedes in 1987.

The A5000 represents a departure from the original Archimedes design and includes two major improvements: an Arm3 processor and the long-awaited Risc OS 3 operating system. The A5000 is a three-box package, with a keyboard, base unit and multi-sync monitor, and it effectively replaces the current A440/1 model.

EXTERNAL DESIGN

From the outside, the new machine looks remarkably PC-like, with the exception of the keyboard, which features the same angular design. In fact this is probably the weakest design feature of the new machine since dust and dirt can collect under the key switches, preventing some keys from making contact.

The main case is a plain rectangular design, without the grey angled moulding of the 400 series. The A5000 is wider than existing Archimedes, but less deep so it can fit more easily on to a normal sized desk. The power switch is conveniently positioned on the front of the machine, and all the connectors, including the keyboard, plug in at the back. Both of these changes make for a far more sensible design arrangement. There is the usual complement of parallel, serial, video, sound and Econet ports. Only the video differs from earlier models – this is a more common 15-pin PC VGA-style connector. Obtaining cables will be no problem for users.

INTERNAL DETAILS

Removing six screws from underneath the machine allows the main metal cover to slide off. Inside, the circuit board is a clean-looking design, with almost every component surface mounted. The Arm3, Vidc, Memc and IOC are all included, together with 2Mb of memory. There is an empty socket ready for a floating-point accelerator when the new maths chip is released – Acorn predict that it will be ready by next spring.

The Arm3 processor is clocked at a conservative 25MHz – slightly slower than a few early A540s and some of the Arm3 upgrade kits for earlier machines, which run at up to 30MHz. But the slower processor is more than made

up for by the faster memory system: the A5000 has a 12MHz memory clock (like the A540), whereas the A3000 and the 300 and 400 series run at only 8MHz. The faster memory means the processor spends less time waiting for data to be written to memory, and it allows much 'bigger' screen modes to be used.

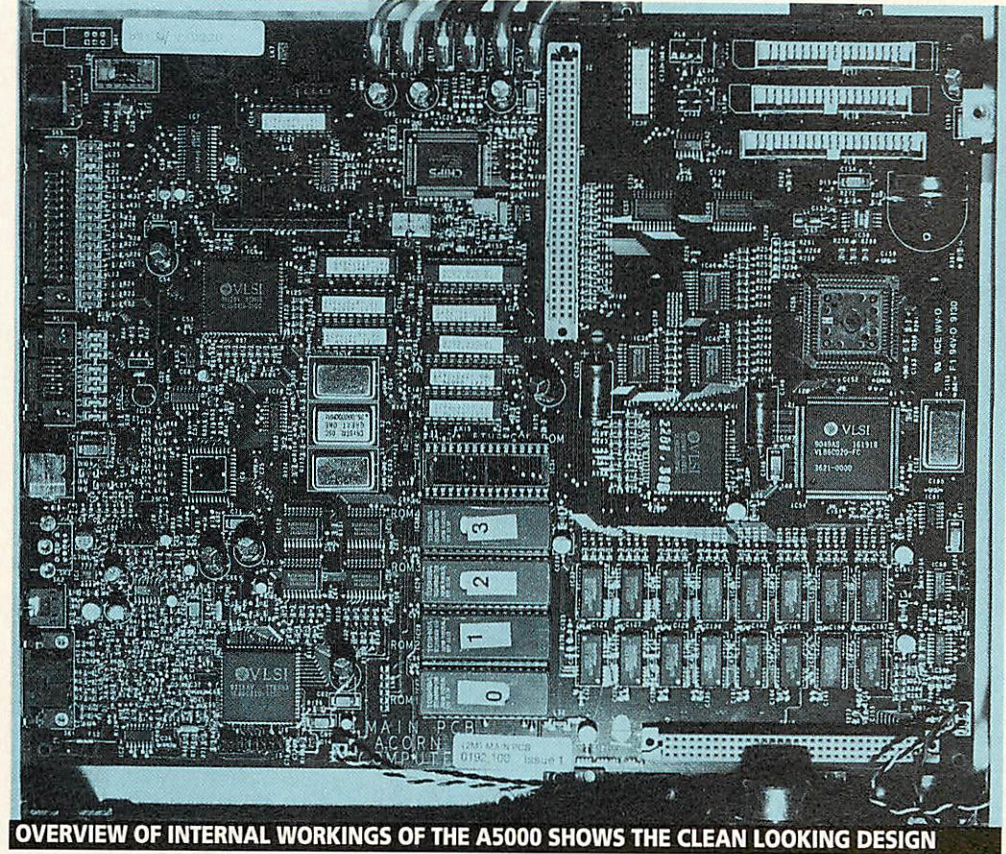
As well as the standard 2Mb of memory, an extra card can be plugged in to hold an additional 2Mb. No doubt companies such as Watford, Atomwide and Beebug will soon provide low-cost alternatives to Acorn's own card.

Also on the board are the connectors for two floppy disc drives and the hard disc. A single floppy drive is standard, although a second can be added below the first. The floppy drive is a high-density device capable of holding twice as much on a disc as previous Archimedes. The Conner 40Mb hard disc uses the IDE (integrated drive electronics) interface, and it is *fast* – around twice as fast as the ST506 drives fitted to A420s.

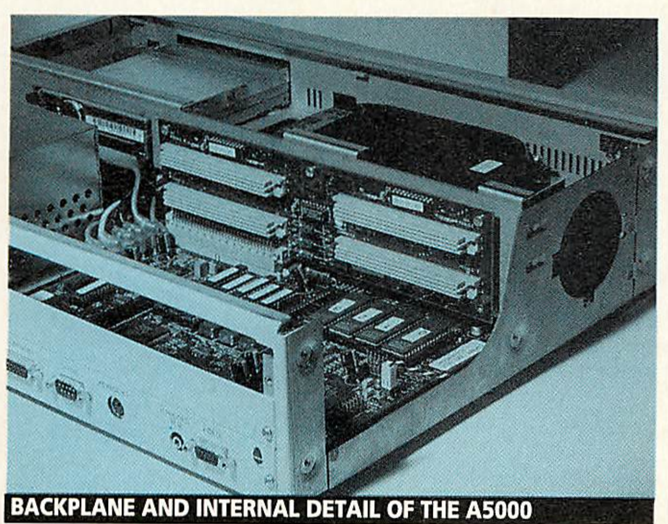
Because it is an IDE drive, no podule is needed for the controller electronics, so all four podule slots on the backplane are available for use. Existing podules for the 400 series will work as expected in the new machine. One that will be important is SCSI – there is no SCSI port, although this has become a very popular interface for professional scanners, external hard discs, tape streamers and so on.

The two drives and the backplane are fitted on a cradle that sits across the middle of the case – it lifts out easily after removing a single screw, although it is trickier to put back — and the cradle allows even the heaviest monitor to be perched safely on top of the case.

The drives lie in front of the backplane – the floppy on the right with space below for a second drive, with the hard disc sitting on the left above the main board and the extra memory board. Behind the backplane, the podules sit on the left and the power supply (with a built-in fan) takes up the rear right. The fan is quiet compared with the A540.



OVERVIEW OF INTERNAL WORKINGS OF THE A5000 SHOWS THE CLEAN LOOKING DESIGN



BACKPLANE AND INTERNAL DETAIL OF THE A5000

The main disappointment in the hardware is that the video display has not been improved. In 1987, the Archimedes' display modes were well ahead of the competition, but there has been no real change since then, except those due to the use of faster memory chips. The machine does support a wide range of new video modes – some are similar to those generated by existing software like Computer Concepts' *ExtraModes*, others follow PC VGA and SVGA standards. The A5000 (or an A540 with Risc OS 3) can go up to 800 × 600 pixels in 16 colours from a restricted palette. But PCs are beginning to offer 1024 × 768 pixels in 16 or even 256 colours, perhaps with a 24-bit palette. Archimedes machines have simply not kept pace.

Having said that, using high-resolution modes on Arm2 machines is less than stunning – they slow down to a crawl in modes 21 or 28. The slowdown effect is considerably less severe with Arm3, so the new VGA-style and existing multisync modes are far more useable than before. And a quality 1024 x 768 colour monitor could set you back more than the A5000 itself.

It is easy to see the A5000 as the machine the A540 should have been – smaller, neater, with higher capacity drives and all the same speed for about half the cost.

But it also has an added bonus – it is the first machine to include Acorn's new operating system, Risc OS 3.

RISC OS 3

At first sight, Risc OS 3 looks almost exactly like its predecessor, Risc OS 2. There are subtle differences: a set of good-looking, high-resolution icons for use with multisync and VGA monitors, for example. These give the desktop a 'finer' look.

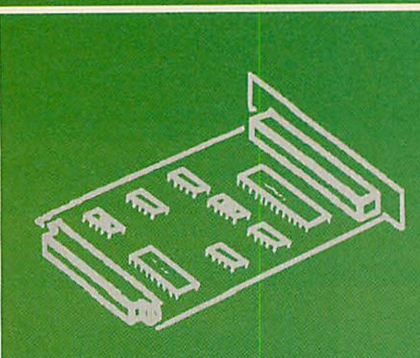
However, the important thing is that any current Risc OS 2 user will be perfectly at home with Risc OS 3 – the system of windows, icons and pop-up menus remains the same and features have been added rather than replaced.

One of the changes that users will notice immediately is that file operations now multitask. Copying a bunch of big files from floppy disc to hard disc no longer locks up your machine. Instead, a window pops up to show how many files have been copied and how many are left. Meanwhile, you can get on with

THE SERIAL PORT

STOP PRESS - A5000 RAM UPGRADE

The Serial Port have released the first in a range of upgrades specifically for the new A5000. The upgrade expands the A5000 up to its maximum memory size of 4Mb. It uses a simple plug in card that is no more difficult to fit than a podule.
The upgrade costs £99 for a 2Mb card - for machines such as the Learning Curve A5000 that already has 2Mb fitted - and £129 to expand a basic A5000 to a full 4Mb of RAM. - Call for details on (0373) 824200

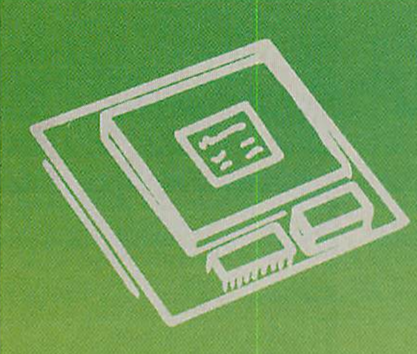


The Serial Port SCSI Range

The Serial Port supply the largest and fastest range of SCSI cards for the Archimedes - as well as a range of devices including hard drives, tape streamers, magneto-optical and CD-ROM drives.
As well as our **standard 8-bit SCSI cards** we now have a new **16-bit SCSI card** which can transfer data at rates exceeding 2Mb per second - certainly one of the fastest SCSI cards for the Archimedes! Our **Turbo Drives** perfectly complement this card with an ultra-low 9ms access time with cache and are covered by a full two year warranty.

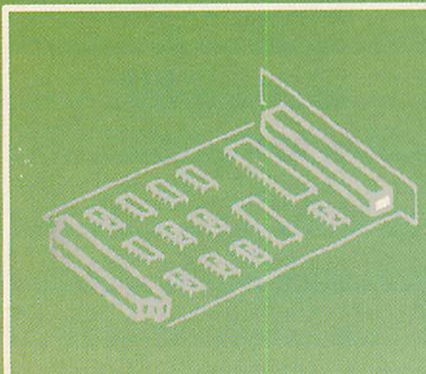
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ARM 3 Upgrade

One problem with computing is that almost as soon as you buy the latest computer an even faster one then becomes available!
The ARM 3 Upgrade gives you the chance to push your present system faster whilst keeping your own familiar system without spending any more large sums of money.
The Archimedes machine is the fastest in its class, but now you can make it go even faster!
The board has been designed to provide the user with 25 MHz ARM 3 performance. In our own tests we have found that once the upgrade has been installed and the cache switched on, the desktop speeds up by around 3 times. High resolution screen modes suddenly become usable and you no longer need to wait for your computer to catch up.
With all our products we include a support promise which means that you have access to, where possible, the people that actually designed the product. We also have a number of skilled software and hardware engineers that can provide you with answers to your enquiries.



The Graphics Enhancer

The Graphics Enhancer is a low-cost, high performance upgrade podule for improving the graphics performance of these machines. The card supports a 24-bit palette, giving 256 colours on screen simultaneously, selectable from 16,777,216 available colours. This allows modes of up to 768 x 288 on a standard monitor and 832 x 328, 512 x 512, 640 x 480 and many more on multisync monitors. (There are also non Desktop compatible 12 and 16 bits per pixel modes)
A Professional version of the Graphics Enhancer will soon be available, which will add full genlock capability to the other features supported by the standard version, allowing any of the 256 Desktop colours to have up to 24 bits of overlay keying, independantly of the rest. Please contact The Serial Port for pricing and availability.
Supplied with the Graphics Enhancer is the Mode Description Language Compiler which allows users to create new modes using the extra video facilities.

Price: £189



Sampler and MIDI Card

The Sampler and MIDI card opens up the exciting world of sound manipulation and control at a price that allows everyone to join in. The card fits neatly in the Econet socket inside your machine leaving valuable podule slots free for other upgrades. (With no unsightly cables protruding from the machine.) All leads connect via an adapter directly to the standard Econet socket.
The cost is low but the specification is high. The board is an 8-bit sampler supporting variable sampling up to 250 Khz with input via a 3.5mm jack allowing connection to audio devices. The software supports a range of features including over-sampling, sample rate conversion and software filtering. Waveform editing is possible with facilities to view the waveform (including real-time analysis), fade in / fade out and cut and paste. The samples are perfect for use in other packages such as Tracker and Armadeus.
The supplied software emulates the latest version of Acorn's MIDI software, allowing it to work with programs that use Acorn's podule.

Price: £69

All prices exclude VAT

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something else and the discs whirr away in the background. The transfer takes a little longer than under Risc OS 2, but you retain control of the machine throughout. This multitasking extends to verifying and even formatting a floppy or hard disc.

There are other time-savers. When selecting file icons in a window, a box can now be dragged out with the mouse to select several files at once. Better still, moving files (shift-dragging them) from one folder to another on the same disc does not take any time at all. Risc OS 3 now simply renames a file, rather than creating a copy and deleting the original file.

Other changes to the file system are more minor – there is the ability to search for a particular file and change a file's type or datestamp from the filer menu. Many small innovations like these are around for Risc OS 2, often in the form of PD (public domain) utilities, but Risc OS 3 incorporates them into the main system.

In the A5000, the floppy disc drive is a high-density type, and Risc OS 3 introduces a new disc format holding 1.6Mb of data on a single high-density floppy disc and, of course, normal 800k E-format 3.5in floppies can still be used. But the new Risc OS also includes Dos disc compatibility – it can format, read and write 720k and 1.44Mb PC discs. In fact, you need never know what format your discs are – ADFS looks at each disc individually to see what sort it is, and the files on them can be displayed in exactly the same way. The A5000 hardware should be able to read Macintosh 1.4Mb discs too, although no-one has written the software yet. On the other hand, Amiga and Mac 800k discs will never be possible.

One side-effect of these multi-format abilities is that, with the *PC Emulator*, you can double-click on the Drive_C partition on your hard disc and the DOS files and directories appear just as if they were Risc OS files. You can drag PC text files from Drive_C straight into *Edit*, for example, without having to use the emulator at any stage.

MAKING COMPARISONS

How does the new A5000 measure up against the PC yardstick? The performance of the Arm chip is an issue, but less so than in 1987 when the Archimedes first appeared. PCs have caught up and the latest 486-based machines are probably a bit quicker, mainly because of their built-in floating point processors. But check the price. The A5000 lines up against 20MHz 386sx and some cheaper 386 machines. These come with a couple of meg of Ram, VGA graphics and an IDE hard disc. Sound familiar?

Put Microsoft Windows 3 on a machine like that and you have today's up-market office PC. But Windows pales into insignificance when compared with Risc OS, in both speed and depth – there are many things you just cannot do easily with Windows. And while there are mountains of DOS applications, Windows software forms only a small proportion of this. Less than one-in-twelve PCs actually run Windows. Risc OS applications are often more innovative and powerful, make better use of graphics and are usually much cheaper than PC equivalents.

In the Apple Macintosh world, the most comparable machine is the Mac IIci. The 5/40 model has a similarly-sized hard disc and the raw performance is not too far behind the A5000, although it costs twice as much. While the standard Mac ci has more memory (5Mb), it needs it – the operating system takes up around 1Mb, since little of the Mac's operating system is in Rom and applications are big.

To many the Mac presents the 'acceptable face of computing' and its visual metaphors are used in Risc OS too: files and folders, toolboxes, buttons, icons and so on. In use on the Mac, the Wimp system is smooth, but because of the single button mouse, it needs weird combinations of the mouse click, plus Alt, Shift and Command keys to drive it.

In many ways, Wimp systems like Risc OS, Windows and Mac Finder show how different computer systems are converging – from the user's perspective. But, in two areas, Risc OS 2 and 3 are streets ahead of both Windows and the Mac – namely, in the control of multitasking and fonts. The Mac has become an icon for desktop publishing, but its font system is needlessly complex. To get smooth outline fonts on screen, you need a separate utility (Adobe Type Manager or ATM), but you also have to install bit-mapped fonts as well. Just to get your font menu into alphabetical order needs another application (Adobe Type Reunion). The whole system is fraught with difficulty for any type family with more than the four standard weights. ATM for Windows acts in a similar fashion.

Any Archimedes user probably views pop-up menus as a natural solution to any multitasking system with several active windows on screen at once. They do not use screen space and you can pop up a different menu for every window or icon you point at. Mac Finder – the equivalent to the Archimedes desktop – is 'simplified' by having a single, fixed menu bar across the top of the screen. If two applications are running, only the one in the foreground window 'owns' the menu, so there is a lot of window shuffling to find the right menu.

With Windows, each application has its own fixed menu across the top of the window. This works fine with large monitors, but Risc OS makes better use of the more affordable ones.

At the other end of the icon bar, the multi-coloured A icon is now an acorn. Clicking Select on it will produce the task manager window. The Task Manager menu includes a number of new options – for example, to shut down the computer – and the Task window that used to be within *Edit* is now where it belongs. An interesting option on the Task menu is to create a !Boot file that automatically starts up all the applications you want. It would be better if this also set the system variables in the *!Boot* file, thus getting rid of the annoying 'Impression has not been seen by Filer' error, but it doesn't. It is easy enough to edit them into the *!Boot* file by hand, but there should be no need. There's still no simple way to save *Configure settings either.

Another new addition to the icon bar is the Apps icon — in effect, a Rom filing system. The Risc OS 3 Roms are four times the capacity of Risc OS 2, providing 2Mb of Rom, and much of the extra space is taken up by applications like *Draw*, *Paint* and *Edit*. All of these have been extended and improved, not least by adding a host of Ctrl-key short cuts for frequently-used functions. *Draw* has changed the most, with new colour grading and tweening functions plus the ability to use rotated fonts.

Alarm, Calc, Chars and Configure are also built in. Alarm is much improved, with better control of repeating alarms, for example, and the ability to run a specific application at a pre-set time. This could be used to automatically download Email while the machine is unattended, or to run a backup program at 2am, for example. Even Calc is now usable – you can use the numeric keypad to enter numbers, rather than peck out figures with the mouse.

MODULES

As well as applications, many modules previously loaded from disc are now in the Risc OS Rom: in particular the CLib, Colours and Font modules no longer take up valuable memory space. Like the built-in applications they run from the Rom, so the 2Mb of Ram in the machine is mostly free for use, rather than being half full of vital modules.

The new font module is noticeably faster in displaying fonts, helped by the fact that the Corpus, Homerton and Trinity families are also in Rom. It is not stuck on the straight and narrow either: in *Draw* for example, you can now have text at any angle, without changing it to a path with *FontDraw*. Old fonts still work, although there is an improved file format for new fonts. DTP addicts will be delighted to see two new utilities supplied on the Risc OS 3 support disc; *FontPrint*, a Postscript font downloader to allow all Acorn outline fonts to be printed on Postscript printers and *T1toFont*, which converts Type 1 Postscript fonts to Acorn format.

The printer drivers are one of the most innovative features of Risc OS, able to coax marvellous graphical quality out of even dot matrix printers. Risc

UPGRADING

An upgrade can also provide some of the advantages:

● ADDING RISC OS 3 TO AN A3000/300/400-SERIES

WILL GIVE YOU:
Upgraded Draw, Paint, Edit, Alarm, Configure in Rom
Rotatable outline fonts in Rom
Multitasking, multi-format filer
New printer drivers
Iconised windows, pinboard
Some new video modes

WON'T GIVE YOU:
The speed of an A5000
High-density discs
New video modes up to SVGA

● ADDING ARM3 TO AN A3000/300/400-SERIES

WILL GIVE YOU:
Most of the speed of an A5000 or 540
More usable high-res video modes (with a VidC enhancer)

WON'T GIVE YOU:
High-density discs

OS 3 incorporates major changes to the organisation of the printer drivers, although internally they work in much the same way as before. There is now a single Printer application, which can accept one or more drivers – so you can have two printers on the icon bar and drag a file to one or the other. But printing does still lock your machine up until it's finished, despite the Arm3.

Risc OS 3 has a lot of neat touches. Pinboard is one – an all-singing, sticky-board utility like those supplied by public domain libraries. The ability to 'iconise' a window makes for a tidier desktop – shift-clicking on the Close icon turns the whole window into one small icon that can be left on screen. And SHIFT-f12 now brings the icon bar to the front – ideal for opening disc directories without having to shuffle your windows around. But there are a few niggles. The *Paint* application still has a few bugs, and Acorn has failed to take on a couple of good ideas from independent software houses. The version of Chars in the Rom is markedly inferior to Beebug's *CharSel*, and there is still no option for a left or right-handed mouse. This would have been simple to add. *Revelation* already includes this choice, but a built-in option, could have applied to all applications.

Risc OS 3 will be available as an upgrade for all current Risc OS machines – A3000s, 400/1 and even 300-series machines. The 300s and early 440s will need small bridge boards fitted to allow the larger Roms to be plugged in, but upgrading a newer machine is a simple task of plugging in four Roms. However, Risc OS 3 is currently in Eprom only, and the cost would be prohibitive as an upgrade. Affordable Roms take a few months to be manufactured, so the upgrades should be available by early spring, next year.

CONCLUSION

Four years on from the launch of the original Archimedes, the 400 series machines are starting to look a little tired. They are no longer clear performance leaders, having been caught up by cheap 386 PCs. And the expensive A540 is hardly the machine to raise the roof.

But just at the right time, Acorn has come up with a cracker. The A5000 has all the performance of the A540 plus Risc OS 3, and at £1800 including a good multiscan monitor and VAT, the price is right. The A5000 is undoubtedly a significant machine and certainly the best Acorn machine since 1987.

Next month, we will take a closer look at the new features of these Risc OS 3 core applications and some of the utilities provided on disc.

PRODUCT DETAILS

Product: Acorn A5000
Suppliers: Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge
Tel: (0225) 245200
Price: £1499 (2Mb) including multisync monitor. An A5000 Learning Curve is also available costing £1799 (ex VAT)

ALL CHANGE

How do you change a picture without redrawing? **CHRIS DRAGE** investigates

Creating pictures on the Archimedes can be time consuming, a particularly trying problem for schools, where everyone seems to need the machines at the same time. One answer is to invest in a library of clip art from which images can be copied to the working document. Now 4Mation's *smArt Suite* offers another solution; a linked graphics system where different parts of a picture can be altered from the menu.

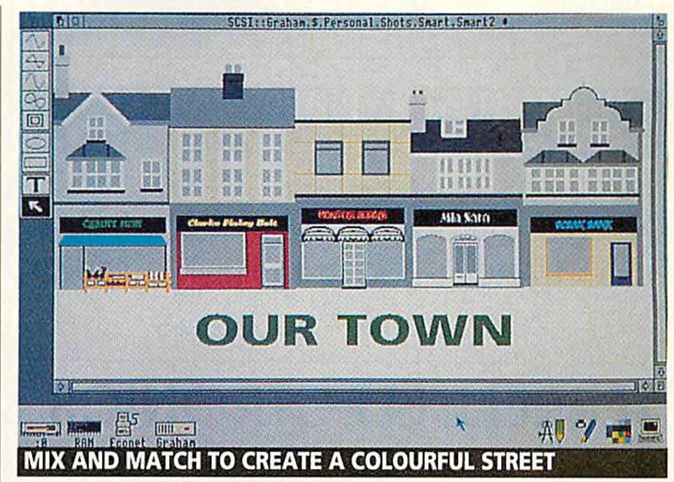
Unlike *Facemaker* or *House* on the Apple Macintosh, in *smArt* the components are automatically scaled so that they fit together no matter how the image is altered.

The *smArt Suite* includes a disc demonstrating the scope of the program. For example, a crowd can be assembled using just two files, *Man* and *Woman*. Clicking on either of these will open a window on an image of the chosen gender. The objects from which the image is composed – the head, body, arms and legs – can be individually selected and a variety of objects substituted either from the general Objects submenu, or from a more specific menu by clicking on the object to be altered. Completed people can be dragged into *Draw*, to be scaled and positioned. The final compilation can be grouped as one object. Completed pictures are saved as draw files which can be dragged directly into other Risc OS compliant applications or saved for future use.

The whole process is very simple. For instance, pupils can quickly design churches with various architectural features, create a range of windmills and assemble and scale a street of shops. Although the choice of objects in any *smArt* file is not exhaustive, each provides enough variety to avoid duplication.

Text can also be added to the files, for example the map of the British Isles. Although the package comes with only two fonts, Montclair and Tabloid (similar to Homerton and Trinity), it does allow students to substitute their own favourite fonts.

4Mation is marketing an expanding range of predefined *smArt* files. A cross-section of these includes *Fashion*: where 10 models can be dressed from two collections; hundreds of heraldic designs in *Heraldry*;



MIX AND MATCH TO CREATE A COLOURFUL STREET

Leisure; *Faces*; *Dinosaurs*; *Trees* and *Gardens*, where a garden can be planted with up to six species of trees and a number of flora and fauna; and finally *Homes*, with four rooms and approximately 200 objects to change in each.

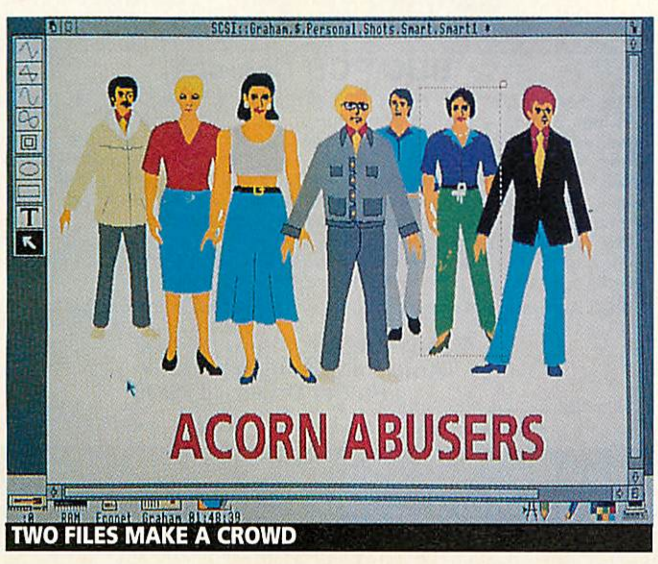
For those artists who would prefer to create their own *smArt* files from scratch, look no further than *smArt Filer*. This utility uses draw files created with *Draw* (or *Poster* and *Draw Plus* among others) and requires a good working knowledge of that package. Using a system of 'parent and daughter' pictures and links between them, source files are created which in turn can be converted into *smArt* files for use with *smArt*. This takes practise and is time consuming but the results are well worth the effort.

In a primary school context teachers can create sequencing and matching exercises. Similarly collections of pupils' poems, stories and relevant pictures can be turned into *smArt* files. Two advantages over *Draw* are that files are easy to locate and view and they are stored in a compressed disc format.

The third element in the suite is *Chameleon* which enables the colours in draw files to be easily edited. Any objects – including single lines of text, text areas, and sprites – can be coloured. In addition to 16 and 256-colour palettes, it also offers 256 shades of grey and an RGB colour cube with a choice of hundreds of colours. These can be changed in hue, saturation and value (HSV values).

Within *Chameleon*, clever undo and redo facilities encourage trials with colour combinations, and a zoom feature allows accurate editing. The results are saved as draw files, with or without four colour separations, or as a separate draw file for each colour.

The documentation is clear with plenty of pictures and tutorials to familiarise first-time users with the *modus operandi*; the inclusion of Acorn's *Interactive Help* shortens the learning curve. *SmArt Suite* adds a new dimension to drawing and I would recommend that third parties begin to set up *smArt* files to support National Curriculum topics.

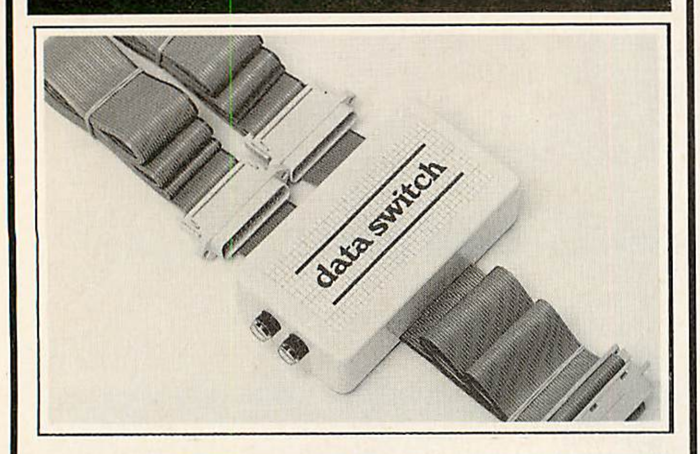


TWO FILES MAKE A CROWD

PRODUCT DETAILS

- Products: SmArt, £55, smArt Filer £35, Chameleon £25, smArt Files, £16 each
- Suppliers: 4Mation. Tel: (0271) 25353

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Some of the features of the Pineapple Digitiser, many of which are still exclusive are as follows:–

- 16 bit true R G B storage in 256k ram.
- Sequences of frames of a moving picture can be grabbed and stored in memory. Up to 30 frames in a 1mb computer, 200 – 300 frames in larger computers!!
- Full screen area normally viewed on a TV set is grabbed in full.
- Images may be processed using our own high speed software routines or Acorn's Change FSI software.
- Quite simply the most powerful and easily used zooming and cropping routines available with any processing package.
- Two independant multitasking applications supplied. Non-multitasking software allows digitising without windows for adding still images to videos.
- Our hardware does not use interupts so other applications run at full speed.
- Latest software includes built-in print routines. (Existing owners please contact us for a free update).
- Hard locking synchronising circuits for best results from video recordings.
- Available in a stand alone box for use with A3000. In this mode it can also be used with 300/400/500 series computers only occupying one expansion slot.
- Free seven day trial.

A300/400/500 £199.00
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Pineapple PAL Coder

The Pineapple PAL Coder is a stand alone unit which provides a coded video signal which can be recorded onto a VHS recorder or fed to a monitor with coded input.

The unit is inserted in the lead to the R G B monitor and provides an R G B output for the monitor together with a full specification PAL coded output. A second version provides a standard coded output but also provides an S–VHS output for improved quality recordings on S–VHS recorders.

Features:–

- External to computer – no expansion slots used.
- Complete sync pulse regeneration providing a full CCIR sync waveform for best results on VHS recorders.
- Selectable to work with 625 interlaced screen modes or 624 line non-interlaced modes.

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S–VHS Version £79.00

BBC PCB Designer

This ever popular Rom based PCB designer is suitable for all BBC micros, It's fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second Eprom is optionally available to add a powerful auto-track routing facility to the program,. This utilises a 'rats nest' input routine and allows any component to be 'picked-up' and moved around the board without having to re-specify component interconnections.

The full auto-route facilities are available even on an un-expanded model 'B' computer. An Archimedes version is available as a free upgrade to existing BBC owners or at a similar price to the BBC version.

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Acorn User – August 88

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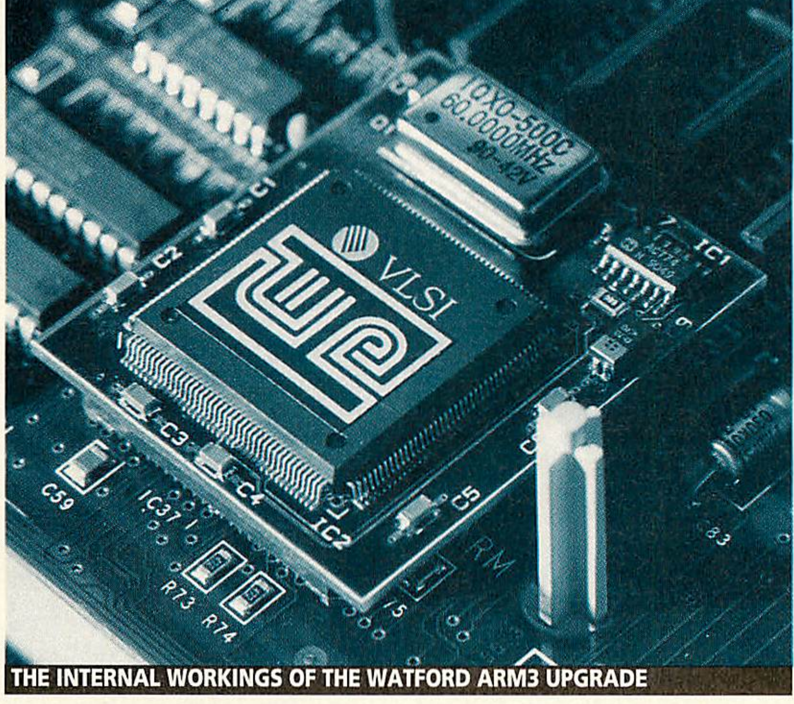
TURBO A3000

PAUL JAMES compares two Arm3 upgrades and tells you how they can speed up your A3000 machine

The A3000 is a fast machine. The clever combination of the Arm2 chip, the Risc OS 2 operating system and well written software has kept the machine, given its low price, at the forefront of technology.

However, time and technology move on and with the release of the new A5000, with its even more powerful Risc OS 3 operating system and faster Arm3 chip, a go-faster speed upgrade is just what is needed to help A3000 owners keep up with the times.

Archimedes 300` and 400 series owners have been able to rectify this for some time by simply replacing the Arm2 CPU (Central Processing Unit) in their machines with a faster one – the Arm3, that is found in the Acorn A540 and new A5000 models. However, A3000 owners have not been able to upgrade with an Arm3 chip – until now. Two Arm3 upgrades, from Watford Electronics and Aleph One/Atomwide, have been launched for A3000 owners but, before we compare them, let's look at the reasons for having an upgrade.



THE INTERNAL WORKINGS OF THE WATFORD ARM3 UPGRADE

WHY IS ARM3 FASTER?

To explain why an Arm3 chip is faster than an Arm2, let's use an analogy. When you need to stock up on some food, you might go to the nearest supermarket, buy some, take it home, then cook and eat it. But you don't go to the supermarket every time you feel a bit peckish – that would be extremely inefficient.

Instead, you would try to stock up on what you need, store it in the larder or freezer and then eat when you wish, restocking the larder from the supermarket when it's empty. Believe it or not, hidden within this analogy is the difference between Arm2 and Arm3 chips... and, no, they're not frozen and crinkle-cut!

The Arm2 chip reads data directly from the 'slow' memory in the A3000 whereas the Arm3 reads 4K chunks of this memory into its own built-in memory, which can be accessed faster – just as it is quicker to go a stocked larder in your kitchen than visit the supermarket down the road.

Having this 4K 'cache' version of the Arm2 installed means that your A3000 can go about three or four times faster, depending on what it is being asked to do. A definite speed improvement cannot be given because, quite often, the machine will still need to access the main memory for some data – just as you might need to buy milk and eggs before having to go to the supermarket again to do a big shop.

HOW IS IT DONE?

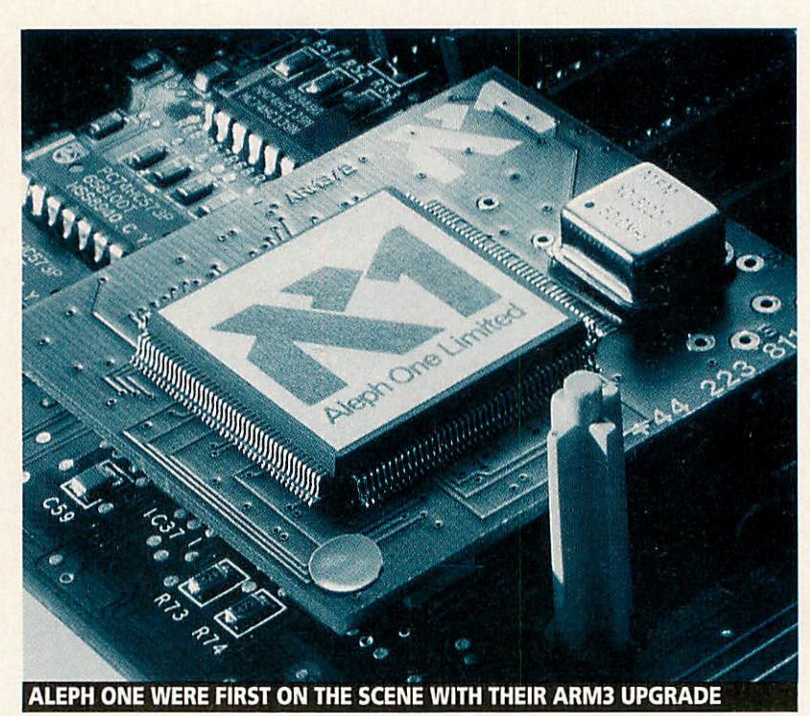
To add an Arm3 to an Archimedes 400 series, owners simply need to use a special extraction tool to pull out the Arm2 from its socket and push the new chip in. But it is not that simple – the two chips are actually pin-incompatible and an Arm3 will not fit into the old socket. For this reason, the Arm3 is supplied on a board with a connector on the underside that fits into the old socket. An adaptor if you like.

Things are slightly more complicated on the A3000. This machine was designed to be economical to produce and, at around the time it was designed, a new technique for making large quantities of complex circuit boards – called surface mounting – was

just becoming a financially viable method.

Normally, a component is placed on to a PCB (Printed Circuit Board) by putting its legs through a hole and soldering them to the underside – the solder makes the electrical connection between the legs and the metal pad on the board. However, the A3000 uses the surface mounting method where the specially designed component is placed on to two metal pads on the top of the PCB and is then soldered on from the top, so that the underside of the board is clean.

Even the Arm2 in the A3000 is soldered on in this way, whereas on an Archimedes it sits in a socket. This means that, in order to remove the A3000's Arm2, you would need to desolder 84 pins, then solder the adaptor socket on the pads for the Arm3 to be housed in. Even with conventional mounting, this is a daunting task that will, of course, immediately invalidate the Acorn warranty.



ALEPH ONE WERE FIRST ON THE SCENE WITH THEIR ARM3 UPGRADE

Another problem that faced the third party developers of Arm3 upgrade boards is that the Arm2 in an A3000 actually sits under the keyboard, just under the backspace key. There is not a lot of room between the bottom of the keyboard and the top of the PCB.

FITTING ON OFFER

The two third party companies which have produced an Arm3 upgrade for the A3000 so far – Aleph One and Watford Electronics – offer a fitting service. Atomwide actually has the facilities to fit the Aleph One upgrade, which is why, if you want the Aleph One upgrade, you send your machine to Atomwide. Watford is working together with a partner company to upgrade machines. Both companies also sell the A3000 fitted with an Arm3 and extra memory if required. Both companies have also indicated that they will be marketing combined Risc OS 3, Arm3 and extra memory packages in the future, thereby changing your A3000 into an 'almost-A5000'.

To have your A3000 upgraded with an Arm3 you will need to send it off to either Watford or Atomwide. Both companies solder on the socket and place the board on it – the only difference you will notice when you get your machine back is that it operates *faster*. Watford also has the habit of sticking its name on the machine, but this can be peeled off if you are not keen. According to both companies, the turnaround for installation is usually five working days.

The boards are physically much the same. The plastic socket is neatly soldered on to the pads and the Arm3 board is placed into the socket. Incidentally, both boards will also fit into an Archimedes 300 or 400 series machine. One other major component on the board is the crystal. This is used to provide the 'beat' that the Arm3 runs to.

The Aleph One board is slightly wider than Watford's, but this is of no real consequence – really it is height that matters here and both boards fit under the keyboard with room to spare. The Aleph One upgrade appears to be the slightly better finished of the two boards, and seemed more sturdy in its mounting, although neither machine could be crashed by rocking the boards on their connectors (and we were definitely not being gentle!)

Attention to detail on the part of Aleph/Atomwide extends to a sponge being glued to the keyboard which applies a small amount of pressure downwards on the board for extra rigidity.

Both companies have the Arm 3s clocked at 25Mhz to keep in line with Acorn's new A5000 machine. No doubt they will produce faster versions if you particularly want them, although the price will vary according to availability.

SOFTWARE SUPPORT

The Arm3 needs a small piece of software to kick the cache into action. There are two extra operating codes in the Arm3 and they simply turn the cache on and off. Why would you want to turn the cache off? Well, because *Lander* is impossible to play with it on!

The Aleph One software is a small application that sits on the icon bar and can be loaded from a boot sequence. It provides a switch and clicking on the icon toggles it from a tortoise symbol (cache off) to a hare. Obviously, Aelph One have never read the story about the hare and the tortoise! The cache can also be configured to turn on on start-up, using *CONFIGURE, but the 'kicker' is still needed.

Watford includes two pieces of software to control the cache – one sits on the icon bar and is a rather more literal picture of a chip, with a two or three in it which denotes whether the cache is on or off. Again, clicking on the icon toggles this state. The other piece of software allows this to be done with definable keypresses, by default – holding down ALT and CTRL turns the cache off, and ALT and SHIFT turns it on again.

CONCLUSION

One factor that is immediately obvious and which is likely to affect the choice between the two Arm3 upgrades is price. Initially, the Aleph One/Atomwide package was priced at £468.83. But that was until Watford announced that it would sell a board at the introductory price of £274.95, including the fitting costs. (This introductory price should last until the beginning of 1992.)

Not surprisingly, this pricing caused quite a stir and Aleph One/Atomwide reacted to the news by promptly dropping the price of their package to £392.45 including the price of fitting the Arm3, although this is still more than the cost of the Watford solution.

Apart from the design differences mentioned earlier, and the large price differential, there is little to choose between the two products. Those who are familiar with both companies, and the reliability of their products and levels of service, may well be swayed towards one or other of the boards. Suffice to say, as with any important purchase, price is only one of the factors (albeit an important one) to be considered.

Either way, if you want to turbo-charge your A3000, then both Watford and Aleph One/Atomwide can both offer you Arm3 upgrades. They can make life a good deal quicker and are worth checking out.

PRODUCT DETAILS

Both prices include fitting, VAT and courier collection of your machine. Fitting, testing and return of the machine is within five working days.

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TO THE POINT

DAVE FUTCHER looks at PinPoint, a new educational database which greatly simplifies the gathering and presentation of data

With computerised data handling playing an increasingly important role in the National Curriculum, it is hardly surprising that many of the major software houses are directing their programming activity towards this area.

A whole range of educational databases, including *FactFile, Grass, Quest, Key, DataSweet* and *Junior Database*, are available. However, many children (and adults too) find the technical terms used in these packages – such as files, records and fields – confusing and difficult. They may spend so much time concentrating on the structure of the database that the original aim of data-handling – using the package to write questions and analyse the answers – is all too often waylaid.

Enter Longman Logotron's *PinPoint*. This new package for the A3000 and Archimedes range takes an entirely different approach to data-handling in comparison to other packages. Here the emphasis is placed, not on the construction of the database, but rather on assembling the necessary questions to support data collection and analysis.

CREATING A QUESTIONNAIRE WITH PINPOINT

FILLING IN THE CREATED QUESTIONNAIRE

QUESTIONS...

With *PinPoint*, the problem of data-handling fields does not need to be considered. Instead the user concentrates on creating a questionnaire to collect the relevant information. This is drawn up on a data collection sheet. The Question tool is selected and a dialogue box appears with a caret in the top space; this is where the question is typed in.

Once RETURN is pressed the caret moves to the next slot, which requests a short name for the question. If the question was 'How old are you?' the short name would probably be 'Age'. As the questions are typed in, *PinPoint* automatically creates the structure of the database from the information provided. This is very user-friendly, especially as the normal requests for field names, the type of data structure and the length of field names are not required.

The easy-to-use Form editor enables users to write questions pertaining to the data that needs to be collected. Allowances are made for questions that require textual, numeric or date answers. Additionally, multiple-choice questions can be included, requiring the user to choose options or place the choices in order of preference. Users simply select the format of the question from a choice of Character, Numeric, Yes/no, Multiple choice, Ordered choice and Date.

When all the questions have been entered, the appearance and layout of the form can then be considered. The questionnaire can be a simple text document or, by adding frames and pictures and changing the typefaces, it can be made to look professional.

The Form designer tool provides DTP-style facilities, enabling customised forms to be created. If required, a logo can be imported to add the finishing touch. The Form designer can cope with both single and multi-page forms.

...AND ANSWERS

Data entry with *PinPoint* is a simple process, with respondents filling in the questionnaire on screen. To answer a question is easy, simply click the appropriate answer box

with the mouse pointer to enter a 'tick'. Built-in checks help prevent any errors, for example dialogue boxes will pop up to indicate if any questions have been missed out.

Data can be entered on several computers simultaneously, as *PinPoint* will allow entered data to be brought together by the dragging of similar datafiles into the *PinImport* window. This is a real advantage to anyone working on an extensive data collection project who has access to a number of computers. It also ensures that data is entered and assembled quickly.

ANALYSIS

Once there are a suitable number of completed questionnaires, the answers then have to be analysed. The search for interesting patterns and correlations is performed at the analysis workbench.

Although *PinPoint* can only analyse the results from a single stack of sheets, up to four stacks can be placed on the analysis workbench to enable comparisons between results contained in the stacks. This would allow for example, a comparison between data collected last year and this year.

When a stack is placed on the analysis workbench, all the sheets in it can be viewed. Some, or all, of the questions and answers can be evaluated and the sheets sorted by the way specified questions have been answered. Sheets can also be excluded or included in the resulting data analysis, according to the responses to one or more of the questions.

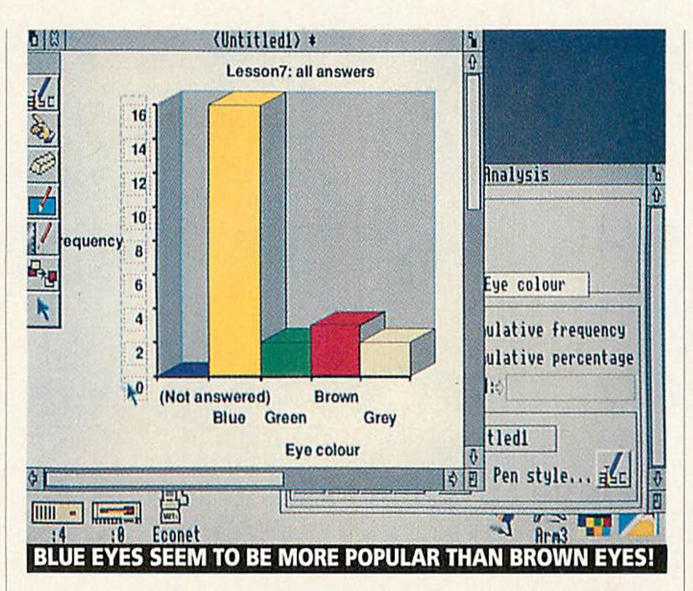
ADDING GRAPHICS

Patterns can often be spotted quite quickly, but some trends are not immediately apparent simply by viewing the raw information. Therefore facilities to display data graphically have been provided.

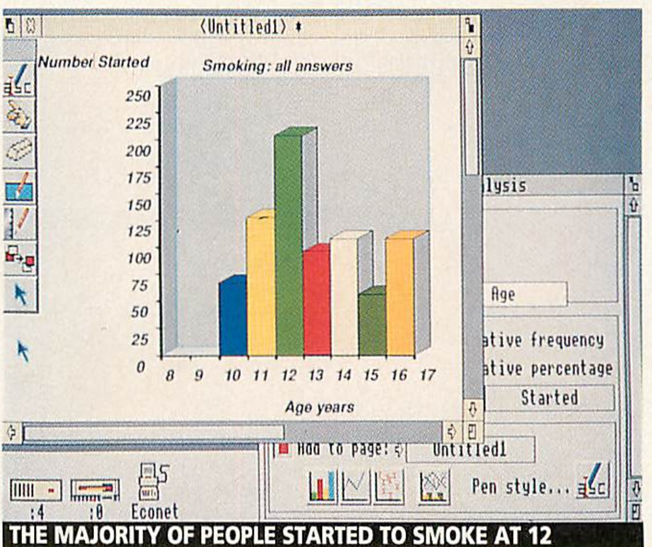
PinPoint provides for different graphs; scatter, pie, line and bar charts can be easily plotted and information from different questions, or even different stacks, can be plotted for comparison. Moreover, the number of graphs per page is not limited.

The appearance of graphical output can be dramatically improved with the addition of explanatory text, and arrows. *PinPoint* also has a graphics presentation editor to help alter the appearance of any graph. This is extremely useful as by using the editor, graphs can be moved, resized and altered. For example, the spacing between the bars on a bar graph can be altered and grid lines can be added or removed. Users may even want to experiment with 2 or 3D presentations and it is possible to define your own customised axes ranges.

Completed displays can then be printed out or transferred to other applications as drawfiles. Information can also be imported from Comma Separated Value (CSV) files, which are the standard export files of many database and spreadsheet packages. This CSV data is read in and displayed in a window. It shows how *PinPoint* will merge the data by indicating where the information from each field in the new file will be stored in the file you are merging with.



BLUE EYES SEEM TO BE MORE POPULAR THAN BROWN EYES!



THE MAJORITY OF PEOPLE STARTED TO SMOKE AT 12

SAMPLE FILES

Many database packages come with a set of sample files and *PinPoint* is no exception. Longman Logotron has provided a *Magpie* binder, called *Examples*, along with the *Browser* application.

Examples contains the datafiles and supporting information. Datafiles can be easily extracted from the binder and the *Magpie* pages ensure that the best use is made of the data by linked information. It is far better than individual datafiles with associated explanatory text files.

The sample files include: personal statistics and attributes for a group of children; volcanoes around the world; information from the burial register of a church for the years 1788, 1809 and 1812; worldwide energy production; UK election results so far this century; a science experiment about a truck travelling down a smooth slope; and a range of performance statistics covering employment, inflation and growth in production for countries in the OECD (Organisation of Economic Corporation Development).

PinPoint comes with good documentation. Although the software is easy to use, the manual is essential to get the most out of the package. It contains an extensive tutorial section with lessons that take the newcomer through the options, from using the form editor and writing questions to obtaining standard statistics about the sheets in the stack and producing graphs.

The manual also has a curriculum guide linking the package's use to an actual data-handling project carried out in a school – the Meadowfield survey which was part of a personal and social education project on smoking.

CONCLUSIONS

PinPoint is certainly a new generation database, making the handling of data as easy as it should be. Its concept and execution is brilliant – data-handling is about collecting data efficiently and that is what *PinPoint* does.

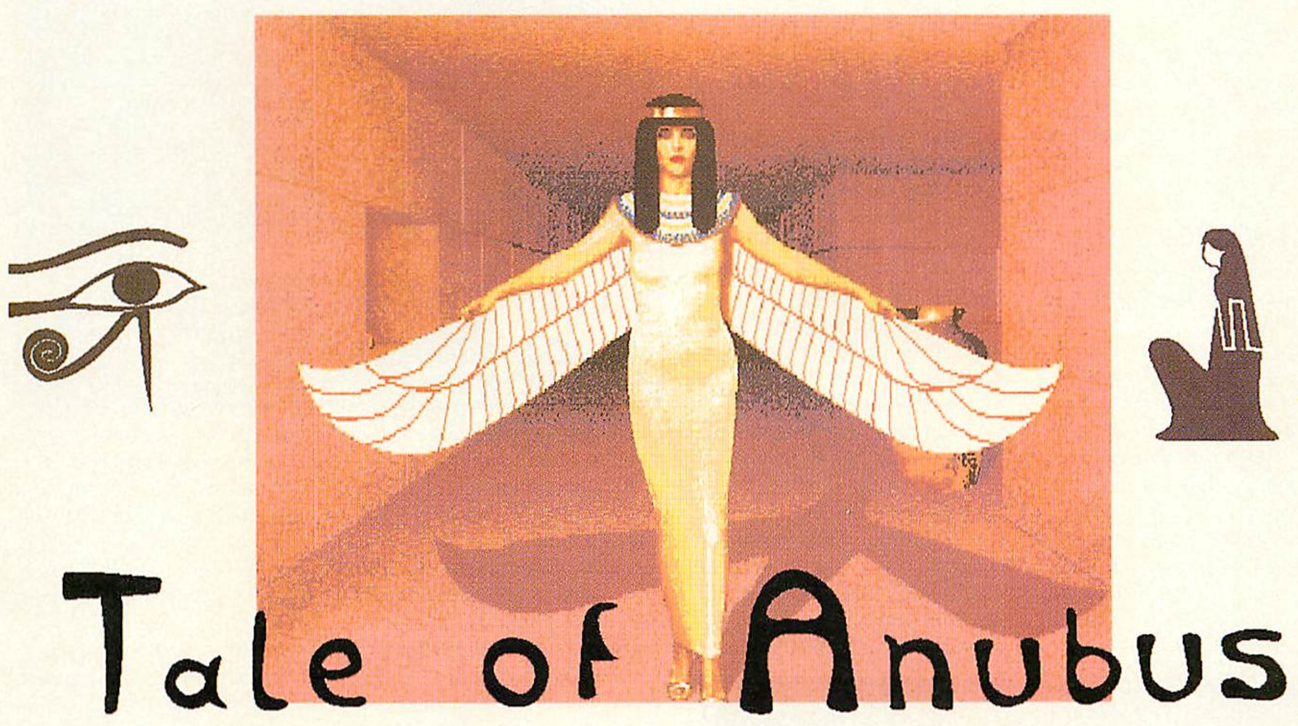
Users can design questionnaires simply, collect information using printed copies of it and then type the results into a screen version of the same questionnaire. *PinPoint* handles all the records and fields automatically and then lets you analyse the collected facts easily. Last but not least, it has a flexible display system.

PinPoint is powerful yet simple to use and will take educational data-handling into a new era.

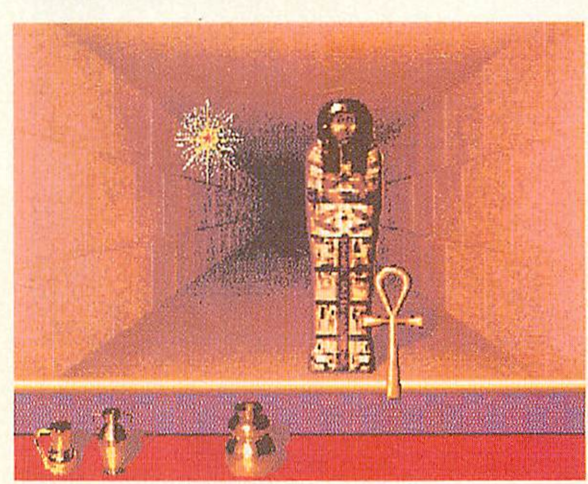
PRODUCT DETAILS

Product: PinPoint
Suppliers: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS. Tel: (0223) 425558.
Price: £99
Description: a user-friendly educational database program
Machines: BBC A3000/ Archimedes

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SPACE ODDITY

Why is Elite, once again, the most talked-about game? We asked two Acorn enthusiasts to air their views

Those of you who managed to squeeze into this year's *BAU* show can't have failed to notice the high profile of *Elite*. The 1984 mega-game is now making a belated re-appearance on the Acorn scene. But how will it fare in the 32-bit market? We put the question to two *BAU* game players and came up with two very different reactions. Here are their views.

THE CASE FOR...

'You could compare *Elite* to a vintage car: it has buckets of class, but can it stand up to modern competition? I think that there are now two categories of *Elite* enthusiast: the hardened commander who played until his fingers blistered on an eight-bit machine, and those who have only recently bought an Arc, to whom *Elite* is all new. Both of these sets will respond to the new version with varying degrees of delight.

The tremendous appeal of the game lies in its deceptively simple structure. As the commander of an off-the-shelf Cobra Mk 3 spacecraft, you must learn the skills of trading in order to accrue wealth and add equipment to your ship. You will also have to become proficient in combat to fend off the various undesirables who may wish to separate you and your cargo by less than peaceful means.

As you progress, gaining yourself a reputation as a law-abiding trader or an unscrupulous pirate, the powers that be may decide to enlist your help in missions of mercy or aggression. These can lead you into dangerous and unpredictable waters and the *Elite* player has a vivid sense of taking responsibility for his or her own destiny. This sense of freedom coupled with what in 1984 were mind-blowing 3D graphics gave *Elite* a unique power to enthral and intoxicate the player, in some cases to the point of obsession.



BEEF UP YOUR COBRA WITH SOME HARD-EARNED CASH

Between then and now, a whole new technology has evolved and *Elite* has also changed. The coders of the new version, Warren Burch and Clive Gringras, have lovingly recreated the old magic, so that seasoned and inexperienced players alike can enjoy the game. There have been many improvements, but no major redesign due to the restrictions of the licensing agreement. This has resulted in a slick version which is impressive, but still very much the product of 1984, rather than something new for 1991.

Perhaps the most significant change is the fact that the game now runs from the desktop and complies fully with Risc OS conventions – an example that other games ought to follow. You can be using another application (as I am now to write this), click on the *Elite* icon, play for a while and then return to an undisturbed desktop.

Naturally, the game now uses solid colour 3D graphics displayed at a rate which, impressively, never drops below 23 frames per second, even when the screen is swarming with spacecraft. Other visual differences include the addition of dots on planet surfaces to show shape and rotation, as well as moons around some of the worlds. Some 3D animation sequences for launching and docking have also been added, sustaining the atmosphere of the game where it once sagged slightly on the Beeb.

There are several original ships (all consistently named after snakes) and one or two surprising new types of objects that you may encounter. For instance, you could well run into a squadron of Hognose missionary ships, intent on converting any heathens that they come across. In several



SOLID 3D GRAPHICS ARE USED THROUGHOUT THE GAME

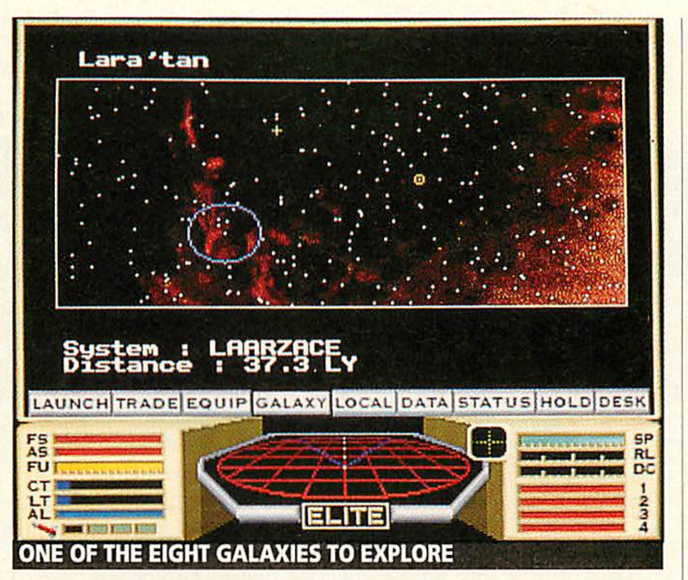
contexts, ships can flock and fly in breathtaking formations. These could be police vipers on a training exercise, or heavily laden shuttles huddling together with an escort for protection against pirates.

As you may expect, any other spacecraft you encounter will have ratings for how belligerent, armed and defended they are. What you might not expect is for them to be intelligent enough to know who they want to kill and why. This is another major improvement. To stumble across political and greed-motivated attacks by ships on other ships is a remarkable phenomenon.

For example, Bushmaster mining craft are often involved in squabbles over the ownership of the fragments of minerals, which they mine from asteroid fields, and pirates often prey on each other as well as you. This intelligence even extends to GalCop, the galactic police force (yes, I know that sounds far fetched). If you have a squeaky-clean criminal record and are set upon by bandits, a passing police craft can break out of formation, glide in, and blow your aggressor into Witch-Space. Conversely, if you have a more chequered past, you might find yourself on the receiving end of GalCop's brand of rough justice.

While playing the role of a thick-skinned trader, your pilot skills are sometimes called upon to carry out more humane missions. This can lead to some interesting moral dilemmas. With your busy commercial schedule, can you afford to save an entire race from extinction? Missions are more involved than in the original *Elite*, which usually consisted of travelling to a particular planet. More complex scenarios are now possible, and the information in the manual may seem inconsequential, but read carefully – it could be vital.

The mouse is used to fly your ship and the improved responsiveness and manoeuvrability it gives renders the keyboard option (provided for die-hards) almost redundant. Additionally, the previously tedious business of trading cargo and selecting a new destination has been made far easier with the help of the mouse, making the game more fluid. None of the atmosphere of the original has been lost and this version retains the quirky humour which characterised the older game.



ONE OF THE EIGHT GALAXIES TO EXPLORE

I would recommend anyone who has never played *Elite* before to at least test-fly the game to see what all the fuss is about. And anybody who has enjoyed *Elite* in the past should not be without a copy of its worthy successor – there are many hours left in it yet.'

Roger Hall

THE CASE AGAINST...

'When the tape version of *Elite* first appeared back in 1984 I played it non-stop for almost a week and continued battling it out for a month or so. However, by this time I was deadly in more ways than one. I had a deadly combat rating, I was deadly rich and, unfortunately, I was also deadly bored. *Elite* was an amazing game for the eight-bit Beeb as its limited memory and speed were fully stretched to bring you the ultimate in space trading games. But no matter how clever and cunning the authors were, after a month the Beeb version of *Elite* could offer me no more challenges.

Eight years later, the Archimedes version has arrived and I must say I was disappointed. True, it is *Elite*, but that is all it is. Here we have a machine that has at least 32 times as much memory as the BBC, with 256 times as many colours, incomparable sound capabilities and goodness knows how much more processing power and the game is still 'only' *Elite*.

True, the graphics are an improvement on the eight-bit's wire frame, but only just. In space, the suns, planets and moons are dull, the other ships are identical in shape to the originals – except that they are now solid and rather garishly coloured – and all shapes are convex. Your ship's interior is also a bit of a let down. There is beige instrumentation with alphabetic indications such as FS for Forward Shield, a tacky menu bar for display selection and a bordered screen where I would expect an over-scanned display. The font is nice though – Fourth Dimension, please take note.

In the space stations, you can use either the mouse or the keyboard to displays maps, trading allowances and your current status, but you can only use the mouse to move the highlight bar and make transactions on the Trade and Equip screen.

The Equip screen is however, a nice touch. Top and bottom views of your craft show graphically what enhancements have been made to your ship. It's a pity that this concept wasn't carried over to the Trade screen, where some form of icons could have been used to represent purchases. The Galaxy and Local maps are the same as in the eight-bit version although the Galaxy map does have a colourful backdrop. You still have to select a planet and then press or click on Data to find out its details. Split screens or a smaller Data screen would have allowed all this information to be visible simultaneously, saving a lot of button pressing.

Finally, before I test drive the Cobra, I do like the way *Elite* sits on the icon bar and can be exited at any time back to the desktop, even though typing in words from the manual does become a pain.

One of my first questions on seeing the Archimedes' *Elite* was 'Can you fly it with the mouse?' Well, yes you can, but it takes a lot of getting used to. Moving the mouse forwards and backwards makes your craft dive and climb as expected, but moving it left and right roll the ship rather than turn it, which is the more common configuration for space flight games. The manual does mention Yaw boosters, which I guess is what I would really like, but you don't seem able to buy them anywhere. The mouse is definitely a good method of control, beating the keyboard hands down; it's just that it's very much an acquired taste.

Combat, the final aspect of the game, has been improved somewhat over the eight-bit version, although you can no longer blast ships to bits when they're mere dots in the distance. This may not have been realistic, but it was fun once in a while! Now there are battles in space, ships fly in convoys and, if you're attacked out of the blue, the police may appear and help you out. And if you pick on some innocent trader, watch out. Perhaps, therefore, some form of training mode or star system where you knew that all other ships were solitary baddies would have been useful. You could then at least have some practise on simple targets before being plunged into the vanguard of a major intergalactic war...

I don't dislike the Archimedes version by any means, I just think it should have gone through a major revamp rather than just undergoing a few cosmetic touch-ups. Back in 1984, *Elite* wasn't merely at the cutting edge of computer games, it took the knife, sharpened it and threw it far as it could. In 1991, sadly the Archimedes' *Elite* is just another game.'

Dave Lawrence

DESIGN AND DEVELOP

DAVE FUTCHER finds out how to set up a successful factory production line

In the so-called industrial age, the factory was the hub of many a community. You didn't need to have computer programs to tell you what a factory was all about, because half of the country was already working in one.

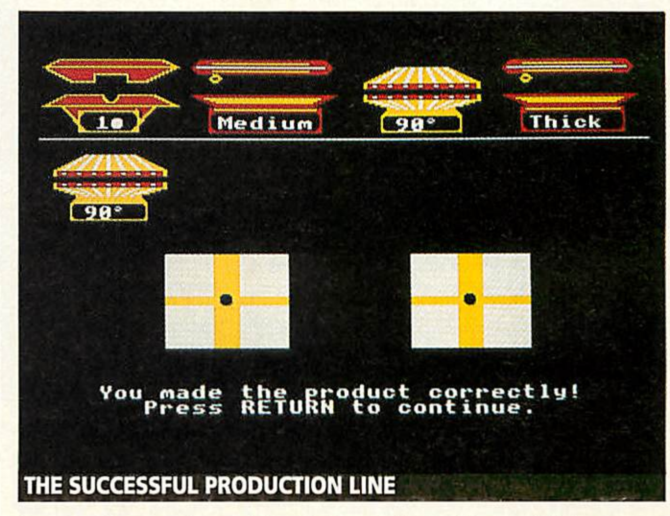
Now times have changed, and *Factory* from ESM is piece of educational software that provides a kind of simulation of the activities of a factory. Although *Factory* is not about making complicated products like bicycles or cars, it does involve children in aspects of creating a geometric product to a specified design.

Factory has three machines – the Punch will punch a circular or square hole either one, two or three times, the Rotate machine will rotate the tile through 45, 90, 135 or 180 degrees and the Stripe machine paints a thin, medium or thick stripe horizontally across the centre of the object. In *Factory* the object is a plastic tile which becomes the product.

The first task is to test out the machines to see what they can do and the effect they have on a piece of raw material. Testing the different machines is great fun and animation is used to make it as realistic as possible. There are moving tiles that go through the chosen machine and come out suitably processed. They are then turned and displayed, so that the effect can be seen. All of the different options for each machine can be tested for as long as required, so that users can build up an understanding of the different designs possible.

The second activity in *Factory* allows up to eight machines to be put together in sequence, to produce a factory assembly line. It is not quite what car pioneers Henry Ford and R. E. Olds had in mind, but it's a good way for children to build up an understanding of what is involved.

Each machine and its function can be set for each space in the line. The line is run and the children can then watch it produce their product.The animation is again very effective, aided by simple sound. You can see the machinery punch a circle in the centre of the tile, rotate the tile through 45 degrees, paint a thick stripe and rotate the product again through 90 degrees and paint a thin strip. The white plastic tile is passed to each machine in turn and, after passing down the whole line, it is displayed. If the finished article is not up to scratch, the production line can be edited by erasing backwards and then running the line again.



THE SUCCESSFUL PRODUCTION LINE

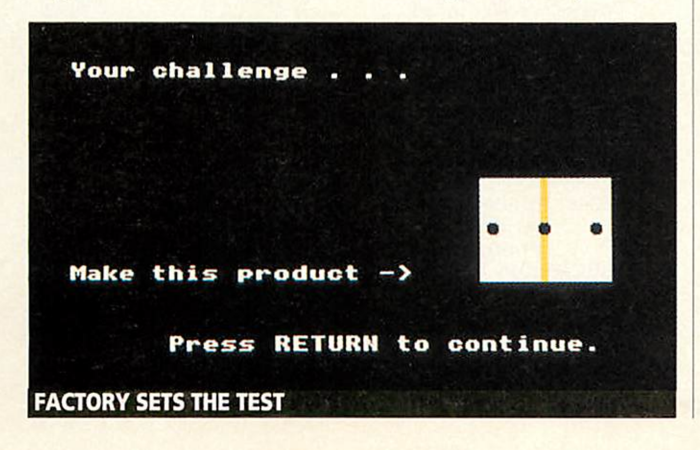
The third part of *Factory* comes into action when a product has been completed. The program suggests that other children are challenged to make the product. The program displays the product and the challenge is to put together a correct combination of machines to create the tile.

CONCLUSION

Factory is flexible and challenging and can be adapted for a variety of tasks. Most of all it is fun to use: children *do* enjoy punching, rotating and putting strips on their tiles and finding out what the machines can and can not do.

This makes it a good program for investigative work at a number of different levels. The younger children may be set the task of finding out what the different machines can do, while older children can attempt to find out the kind of designs they can create with the machines. *Factory* will certainly sharpen up children's problem solving skills and it challenges them to solve spatial problems by investigating sequences of operations in a new and unique way.

Teachers and parents now live in the era of the National Curriculum and *Factory* can be used to make all sorts of links. Its will support programmes of study that require children to 'produce a realistic, appropriate and achievable design by generating, exploring and developing design and technological ideas', 'make and test generalisations', and 'define and reason in simple context with some precision'.



FACTORY SETS THE TEST

PRODUCT DETAILS

Factory is published by ESM, Duke Street, Wisbech, Cambs PE13 2AE Tel: (0945) 63441. The program is available for the BBC Micro and Master series and costs £27.50

NEW

Archimedes Software

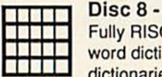
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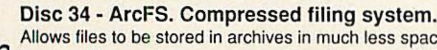
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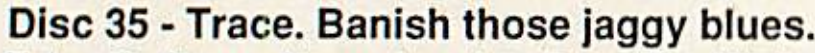
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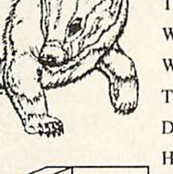


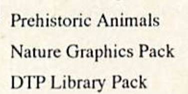
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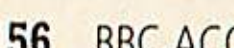
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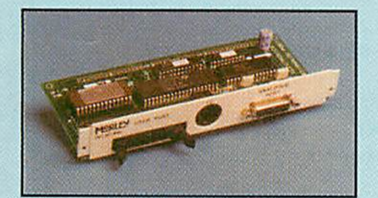
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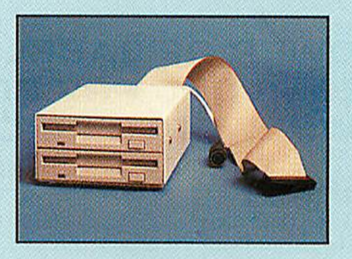


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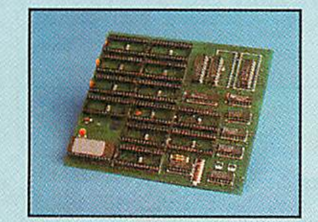
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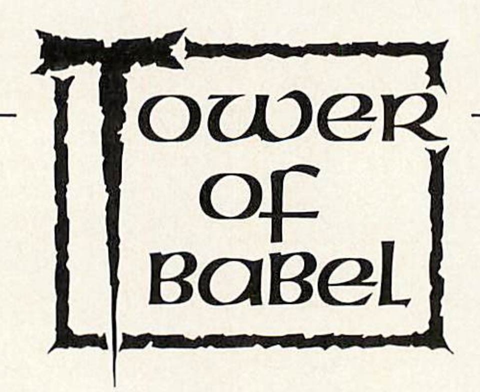
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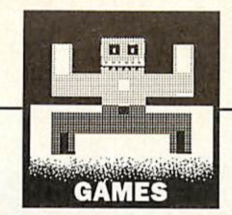
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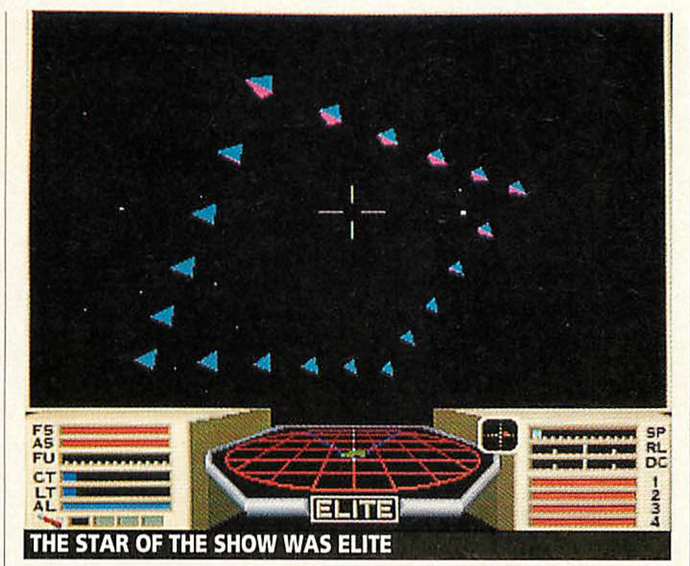
GAME SHOW

'Like hot cakes, mate' was how one happy man at the *BAU* Show described the reaction to his stock of Archimedes' *Elite*. And it was true; the crowd was eager to get hold of the game and, in at least one case, the punters literally fought their way to the front of the queue to buy it. But, in spite of the excitement, there are two things I want to say about *Elite*.

My guess is that those desperate *Elite* fans were mostly old BBC Micro hacks, yearning to return to the world of space trade, adventure and combat. They will not be disappointed, for return they shall and they will no doubt regard the solid graphics, formation flying and extra missions as a set of welcome new angles to what is, perhaps, their favourite game ever. But the question is, does the new *Elite* actually offer anything significantly new?

My point is this. If *Elite* was released on the Archimedes without solid graphics, many an eyebrow would be raised. Solid graphics are expected, yet one could argue that only minimum additions have been added to the game to bring it up to the standard that we have all come to expect.

Elite is *Elite* is *Elite* is perhaps the best way to put it. What you get is an extremely fine version of the original game, but that is all. The game doesn't stretch the computer very much. The authors themselves speak of the high 75 frames per second that it has been known to achieve, which leaves plenty of space for extras. But they're not there, for the simple reason that this version of *Elite* was written within the broad boundaries of the original. Now *Elite* was, in my opinion, the greatest game available for the BBC, so this is fine – just so long as the punters know that what they are getting is *Elite*, nothing less and not much more.



THE STAR OF THE SHOW WAS ELITE

That brings me on to my final comment. Some people are vowing that this is the greatest game ever. Of course, we are all entitled to our own opinion, but by bestowing such an accolade, the user is also saying something else – that the game stretches the computer to its absolute limits and Archimedes' Elite was certainly not designed to stretch the machine.

So what about the *BAU* Show apart from *Elite*? Well, it was the most successful show ever, at least from the games point of view. Both The Fourth Dimension and Krisalis Software covered their costs within three hours on the first day, and the 'hot cakes' report regarding *Elite* could be applied to quite a few stands around the show.

The Acorn Games Arcade was constantly packed, not only with Acorn users but also with famous stars such as Steve Backley and Fatima Whitbread, although from the look on Steve's face I don't know quite what he made of *Lemmings*! Speaking of which, did any of you spot the escaped lemming running around the show? Bet you didn't know that they were that big did you? Luckily, the roaming lemming did not start digging holes or falling off the balcony and it certainly didn't try to self-combust.

Eterna was over from France to demonstrate its latest Archimedes' titles, including *Cartoon Line* the game that has been hitherto advertised as 'top secret'. This is an interesting game, and one that carries a certain scent of originality. Visually it looks like a cartoon. It has colourful background graphics and large, well-drawn and highly detailed figures, which all look and behave in the manner of typical cartoon characters.

As a cow-person in the wild west the idea is basically to stay alive. A whole variety of creatures will give you hassle, ranging from charging buffalos, stinging scorpions, and hot-headed Red Indians to vultures with very long necks. Each menace is dealt with in a different way and a great deal of humour has been incorporated into the game. The only reservation is that *Cartoon Life* is just too darn hard!

Also, Cambridge International Software has some new releases on the way, the most evident of these was zooming around Silverstone at 135 mph on CIS's stand at the show. *Chequered Flag* is a racing car simulator that stands boldly and shamelessly in opposition to The Fourth Dimension's *Saloon Cars*. There is a certain amount of similarity but also great differences. I haven't had time to get into the driving seat yet, but it looks very similar to *Revs* on the old Beeb. I will say however, that the menus which allow you to fiddle around with the car and set up brakes and gears and so on are fantastic; I am very impressed. It is the most easy to use front end I have ever come across.

Also on the horizon from CIS is a game called *European Mah-Jong: The Game*, in which you pit your wits against up to three computer Mah-Jong experts. 'Ideal practice for Mah-Jong addicts, especially if you're a sociophobe,' was the comment from CIS's Mike Fowler.

Finally, *The Last Ninja* is coming to the Archimedes! Superior Software fought honourably (over the telephone) for the licensing rights and won. Acclaimed programmer Peter Scott, of *Sim City* fame, coded the BBC versions and is, or at least he should be, working on the 32-bit game as we speak.

As well as improvements to the graphics and the inclusion of sampled sounds that we take for granted, Superior says that the puzzles have been changed slightly. This is intended to give some old hacks a fresh challenge – always a welcome move in the Acorn world, as the new release of *Elite* this month has so pointedly proven.

Sam Greenhill

Air Supremacy

Superior Software
Tel: (0652) 58585
Archimedes/A3000/A5000
£24.95

What do you get if you cross *Zarch* with *Conqueror*? No, not Zonqueror but *Air Supremacy*, Superior Software's latest venture into the Archimedes games market.

Set in the future *Air Supremacy* puts the world's destiny in your hands. War rages over Antartica in an effort to control what remains of the earth's resources, and by progressing through various levels in the combat simulator you prove yourself worthy to fight in the real world.

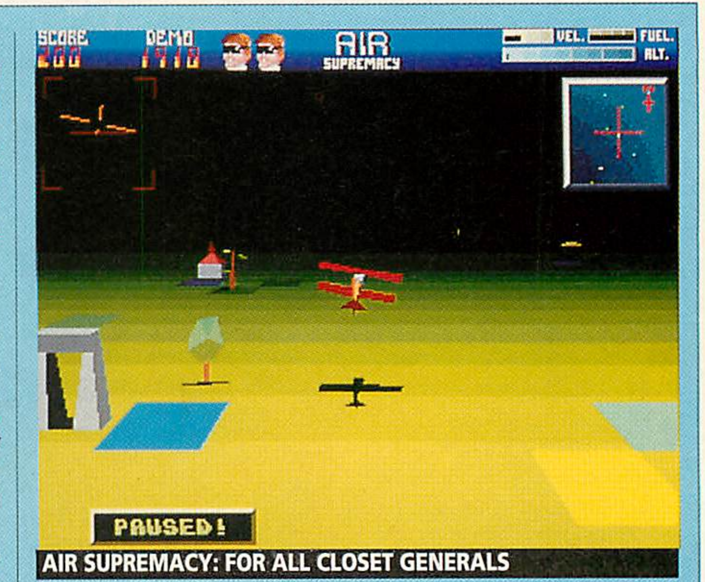
Each level is based on an infamous 20th-century war: 1918 puts you in charge of biplanes and old tanks; 1944 moves to the Pacific Ocean and offers a choice of planes or gun boats; 1991 in Arabia gives you control over either a Stealth fighter or tank.

In each level you can switch between the two methods of transport, depending on how you wish to fight the war. However, being able to switch like this requires a lot of thought and strategy. Obviously there are times when one is more suitable than the other but there is no way of completing a level without operating both types of machine.

Once each level in the simulator is complete (not an easy task) you can move on to the future – the current year is actually 2150. Space-age fighter jets and hover cars will replace the planes and tanks of earlier levels, and everything suddenly becomes rather fast and furious.

To play, *Air Supremacy* is much like its predecessors. Any vehicle can be controlled via the mouse or keyboard and, as in *Zarch*, it can take some getting used to. Dog fights are especially tricky.

Graphics are also similar to *Zarch* and *Conqueror*, even down to the shadows on the ground and the smouldering remains of shot-up buildings and trees. Unfortunately there are no hills. Everything is flat, although there are quite a few objects such as houses, churches and trees to decorate the landscape. There is no sky to speak of, it's just a black void, although this could be due to the exhaust fumes from all the machinery.



AIR SUPREMACY: FOR ALL CLOSET GENERALS

Everything runs quite smoothly and the sense of speed when flying around is excellent. Skimming along the surface in a Stealth fighter is particularly fun, especially when you pick off any unfortunate trees that happen to be in the way.

The price of £24.95 isn't really that much when you compare it to the competition and, while *Air Supremacy* won't be everyone's cup of tea, its mixture of arcade-style fighting and strategical planning should appeal to all those closet generals out there.

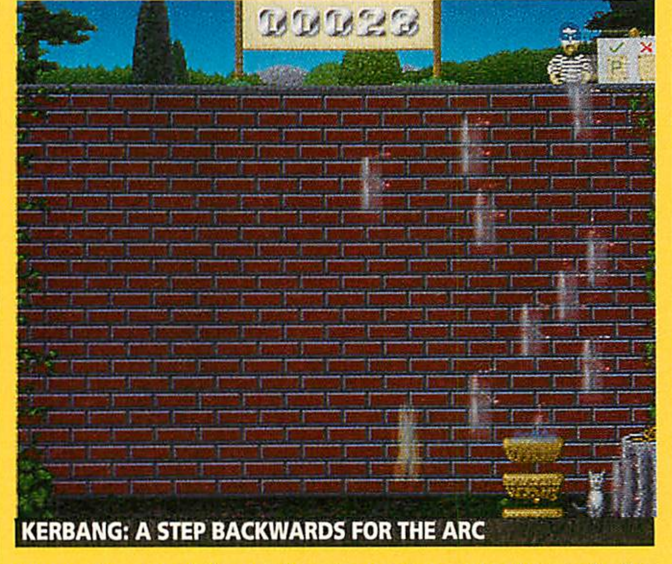
Rob Miller

Kerbang

Eterna
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Archimedes/A3000/A5000
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I'm not really sure where to start with *Kerbang*. It's not that there's an impossibly complex plot, or lots of devious gameplay. Quite the opposite really. Catch some bombs in a bucket and that's about it. If you can remember back to the days when computer entertainment meant tiny hand-held games, that incorporated the latest in digital time pieces, you will no doubt have seen something similar to *Kerbang*. But, unfortunately, games of that sort did not require much intelligence, nor were they addictive. Likewise, *Kerbang* falls neatly into the 'seen it all before' slot.

The actual game consists of a high wall, over which a masked person drops bombs. These bombs have to be caught in a bucket, which you move along the base of the wall, to prevent them exploding on the ground. In practise, it's a bit like trying to play *Breakout*, except that the ball returns immediately.


KERBANG: A STEP BACKWARDS FOR THE ARC

Bonuses can be caught to give you extra lives and wider buckets and there are little torpedoes (looking more like small fish) that, when caught, have an adverse effect such as switching the direction of your bucket. If you drop a bomb, you lose a bucket, and after three buckets, that's your lot.

To be fair to *Kerbang*, it has some nice touches. Loading the game installs the *Kerbang* icon (an animated bomb) on the desktop icon bar. Game options including sound and the number of players can be changed from the desktop, and the game runs by simply clicking on the icon. Returning to the desktop is simple and everything remains untouched.

Graphics are reasonably good. Mode 13 is used for 256 colours and everything is extremely smooth. About the best thing graphically is the high score table; unfortunately this is not a very good reflection on the game. The sound is also average and can be turned off, along with the rather annoying music.

All in all, *Kerbang* is a real backwards step for the Archimedes. I've said in the past that any new game on the Arc was welcome, although the time has come when we can expect something more in keeping with the Arc's superior features. What we don't want are sub-standard eight-bit games, glossed over with pretty graphics and sound.

Unless your idea of fun is hanging around at the base of walls (or indeed, banging your head against them) steer clear of *Kerbang* and spend your money on something rather more deserving.

Rob Miller

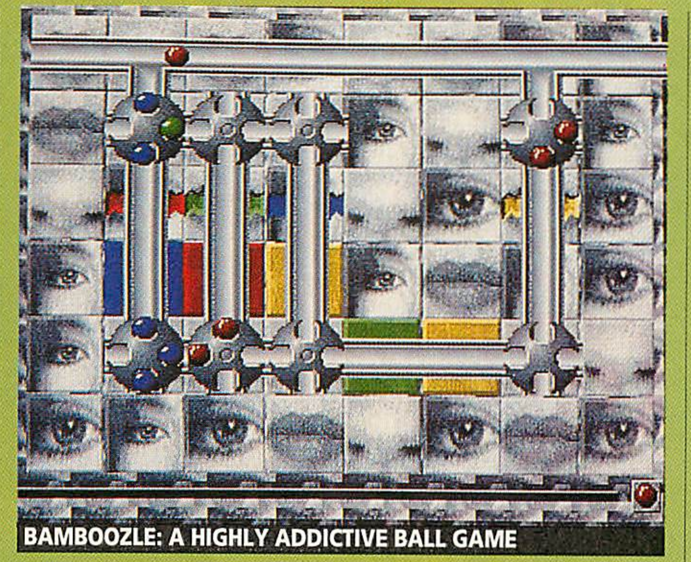
Bambuzle

Arxe Systems
Tel: 081-534 1198
Risc OS machines £16.98

In *Bambuzle* you are presented with a structure of metallic pods (wheels with slots) connected by lanes, some pretty background tiles and an earfull of dodgy music. Every so often a coloured ball rolls into the top lane and drops into any vacant slot in one of the pods. If there is no vacant slot it just rolls backwards and forwards until the cows come home or the time runs out, whichever happens first.

That is unless you make a slot available. *Bambuzle* is mouse controlled and clicking Adjust over a pod will cause it to turn 90 degrees, thus revealing another slot. Clicking Select on a ball will send it off down a lane to find another slot. The idea is to fill all four slots in a pod with four balls of the same colour, and you've got to do it for each pod.

As far as the plot goes that is all there is to it. However, it is one of those games that are easy to learn but impossible to master. At first the scene looks a bit like the car park in a driving school; the brightly coloured balls venture off in all directions, some careering into stationary balls, others getting stuck on the roundabouts (pods) and all the time new balls are rolling on, regardless and oblivious. It's absolute mayhem!


BAMBOOZLE: A HIGHLY ADDICTIVE BALL GAME

Get used to using the mouse and turning the wheels however, and it soon becomes quite easy. Now the task is to decide exactly where you want the balls to end up and how on earth you're going to get them there, for on the later levels there are some serious problems. Half way along a lane, for example, they might be a groovy little gadget that only lets yellow balls through, or there might be a special tile that changes the colour of any ball that passes it.

Hence it is both dexterity and fast strategic thinking that wins the day. *Bambuzle* is very addictive and I certainly feel that urge to have one more go. There are a few niggles of course. For one thing, I can't help thinking that as an Archimedes game we could be treated to a few little extras. For example, when the balls roll over a change-colour tile a brush could pop up and paint them as they roll by, rather than changing the colour instantly. Also there appears to be a strange bug which causes the computer to crash when you press Escape – this could be serious.

The most annoying part of the game is the fancy fades and tricks used to display a new screen – it is very slow and very tedious. When you fail a level, you normally want to try again immediately, not wait more than 40 seconds while clever fading routines show off. The front end is my only main complaint and, although this is a failing point, in play *Bambuzle* is both enjoyable and greatly addictive. I like it!

Sam Greenhill

Chuck Rock

Krisalis Software
Tel: (0709) 372290
Risc OS machines £25.99

Hot on the heels of those suicidal *Lemmings*, Krisalis has come up with another high quality conversion. This game is already a smash hit in many other computer formats. It has become a cult in Japan and France and now it has arrived on the Arc.

Chuck Rock, your average under-evolved neolith, has had his wife abducted by a local hood and you have to help him battle his way through 20 levels of assorted dinosaurs, amoebas and other prehistoric nasties to win her back. This is a platforms game with a difference: the scenery in every screen contains two depths of faultlessly-scrolling parallax and some of the character animation is nothing short of inspired. The graphics for the creatures and objects you encounter are on the amazingly large size and this, coupled with sampled grunts, squawks and squelches, not to mention a hilarious intro animation sequence, gives the whole thing a marvellously cartoony atmosphere.

CHUCK ROCK: ANOTHER SMASH HIT IN THE MAKING

Chuck himself looks and sounds like an estranged cousin of Fred Flintstone and defends himself against swooping pterodactyls and the rest by ramming them with his considerable midriff, or simply throwing large boulders on top of them. The terrain you explore has a changing theme to it and as well as bringing you nearer to rescuing Ophelia, takes you through the early history of the Earth. In the course of the game, you will witness the ice-age (with the double-level graphics producing some incredible ice effects) and watch the dinosaurs become extinct. In these levels there is some poignant artwork of forlorn stegosauri slumped over rocks or propped up against heaps of bones, adding a sad note to the unadulterated fun of the game.

Every four screens or so there's a bonus level inhabited by an extremely large creature which has to be defeated. I don't want to spoil any of the game's best moments for you but do keep an eye out for a sabre-toothed tiger...

My only criticisms are that, on some levels, the effect of water has been achieved by overlaying a mesh of closely-packed blue dots on to the existing graphics, obscuring some of the best characters. This also causes a nasty, flickering interference pattern because of the way backgrounds have been drawn and move past each other. These are minor points though, and should stop no one with a sense of humour from donning a loin-cloth and buying this game without delay.

Mat Tizard

Blitz and Bubble Fair
Arxe Systems
Tel: 081-534 1198
Risc OS machines £21.23

Bubble Fair is a game about bubbles. *Blitz* is also about bubbles, hence the reason for this comparative review. A sad fact of such a review is that, even if two games were to be almost identical, the punter will only want to buy one.

The idea in both games is to burst bubbles by means of firing a spike (*Blitz*) or a yo-yo (*Bubble Fair*) upwards. Once popped, a bubble bursts into two smaller bubbles and so on until the smallest size has been destroyed and you're rid of it for good. Occasionally a bonus will drop from a burst bubble to give you things like greater speed, extra lives and spikes or yo-yos that stick to the ceiling, forming a pole for the bubble to run into.


BLITZ: CHEERFUL GRAPHICS AND FUNNY SOUND EFFECTS

There are various bonuses in each game but perhaps the most humorous is the 'pint glass' bonus in *Blitz* which reverses the gravity affecting the bouncing bubbles, accompanied by a 'wow man' sound sample. A shield is probably the most useful bonus to have in either game.

The first time I tried to load *Bubble Fair* a message briefly appeared to say something like 'Don't worry. This won't affect your configurations.' The next thing I knew, I was staring at a blank screen with a star prompt and virtually every module in the machine unplugged. This was my introduction to the game but I did get it working in the end.

In *Blitz* each new screen has a different set of bubbles of varying sizes. Later on there are platforms and ladders to make it slightly more difficult and after that there are cages from which you must release the bubbles. As far as I know those are all the things that make up the game.

However, *Bubble Fair* involves a bit of strategy if you can call noughts-and-crosses strategy. It is set in a fairground and an evil sorcerer has assumed control of all the fairground attractions – a bit like a protection racket. To win them back, the boy must collect the ice cream trapped inside one of the bubbles, and there are two screens at each attraction. When he succeeds in grabbing the ice-cream he flaps his arms about in a very rigid way and a bell starts clanking. It looks as though someone has stuck a bell, connected to 240 volts up his... well, you can imagine!

If you complete both screens the stand will receive a 'nought', otherwise it is adjourned with a red cross. All nine stands are arranged in a noughts-and-crosses shape and so a line of three noughts will take you to the next level.

In fact that is very very hard to do. I managed it once after concentrating on that one objective for two hours. The problem is that if you lose a single life you have to start again. There is also the slightly odd fact that if you fail on the first screen it takes you on to the second nevertheless, even though it makes no difference if you complete it or not. *Blitz* has a password feature, *Bubble Fair* does not.

If sound is important to you then there is something to choose from here. *Bubble Fair* contains fairground music but nothing particularly noticeable in terms of sound effects. On the other hand the sound in *Blitz* is nicely implemented and very humorous, though it lacks any music track.

Graphically too, there is a rift. In *Blitz* the background graphics are very cheerful and detailed, although without any particular relevance to the game itself. *Bubble Fair*'s backgrounds are digitised photographs of scenes from the fairground attractions but although these are pretty, they tend to be a bit murky and complicated, so that sorting out what is happening on screen is a bit tricky.

Blitz has its problems, mind. It has crashed my computer at least twice so there's obviously some dodgy code floating around. It also has the same sort of problem as *Bambuzle*: if you lose all your lives on a level but want to try again, you have to wait for well over a minute while it loads the same level.

The two games are in fact not all that similar. If *Bubble Fair* was easier, I would argue that enough differences exist to give credence to the argument both publishers would undoubtedly make: that they are both completely different games. But *Bubble Fair* is too hard. I go for *Blitz*.

Sam Greenhill



BUBBLE FAIR: CAN YOU GET PAST THE FIRST LEVEL?

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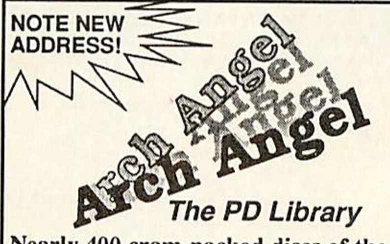
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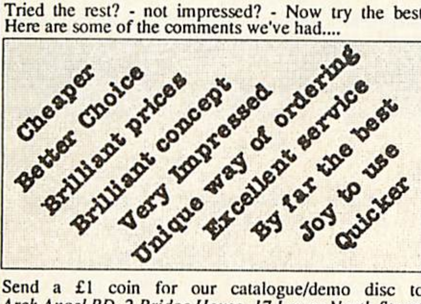


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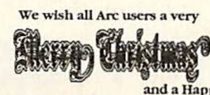
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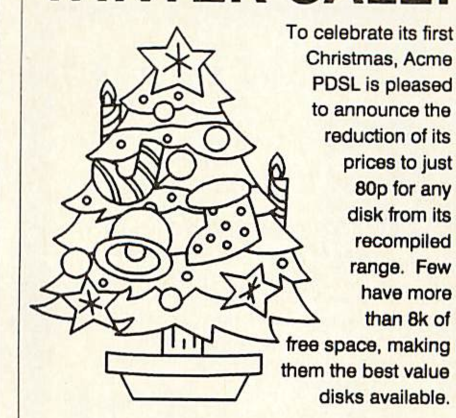
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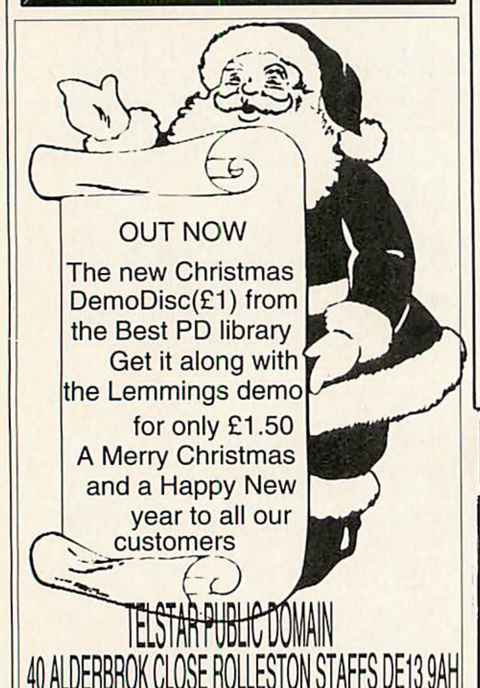
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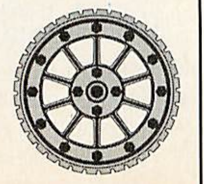
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Badger	8

Francis of Assisi

Francis Bernardone, better known as Saint Francis of Assisi, lived in the 12th and 13th centuries and became well known for his love of nature. Through some painstaking historical research, we have managed to come up with a program that simulates Francis' great work. You play the part of Francis during one of his many walks in the forest. You notice that in one particular grassy clearing, many woodland animals turn up in need of your caring services. You can move about the clearing with Z, X, / and : To tend to an animal, approach it slowly and hold down RETURN. When the animal is cured it will disappear and you will be awarded points appropriately (see table). Of course, being a saint, you never die. For this reason, serious players may like to add a 'save game' option so that you can continue playing at a later date.

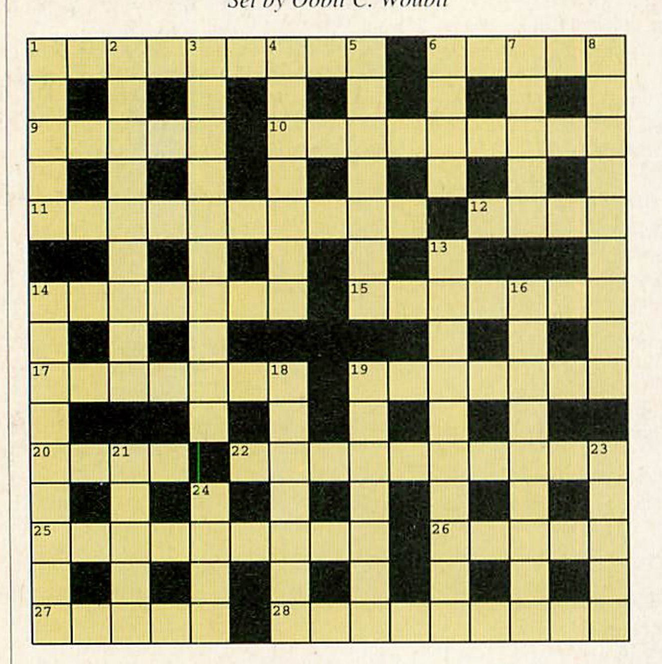
```
 10 MODE7
 20 m=7^4
 30 $m=" MVHSRFB"
 40 f=HIMEM+99
 50 REPEAT
 60 VDU42
 70 UNTILVPOS=23
 80 VDU284;21,294;12,26,31
    ;23
 90 REPEAT
100 p=HIMEM+RND(920)
110 ?m=?p
120 ?p=m?((?p=32)*RND(7)*(
    RND(200)=1))
130 k=INSTR(" ZX:/",INKEY$
    0)
140 d=f+(k=2)-(k=3)+40*((k
    =4)-(k=5))
150 a=d
160 t=?d>64ANDINKEY-74
170 s=s-t*INSTR($m,CHR$?d)
180 d=d+(d-f)*(?d>32)
190 a?(NOTt*m)=32
200 ?f=32
210 ?d=64
220 f=d
230 PRINTCHR$13s;
240 UNTIL0
```

As seen in previous puzzle pages, some one line games are actually too long to type in on one line; *Assisi* is one such game. Our **Info* regular, **Garry Quested**, has pointed out that our original squasher is far from ideal for a number of reasons and has send in a far superior version for which he earns himself £5. His code is shown below. Pressing *f0* will squash a listing, concatenating all the lines and adding colons where necessary.

```
*KEY0 f=PA.+4:t=f:b=&F5:RE
P.c=(b<>&F5):?t=-?t*NOTc-5
8*c:t=t-c:x=f?-1:FOR i=1TO
x-4:b=?f:?t=b:f=f+1:t=t+1:
N.:f=f+4:U.f?-3=&FF:?t=&D:
t?1=&FF:?(PA.+3)=t-PA.|M
```

BBC Acorn User cryptic crossword, December 1991

Set by Oobit C. Woubit



Chambers 20th century Dictionary is recommended. Send your entries to *BBC Acorn User*, 20-26 Brunswick Place, London N1 6DJ to reach us by Friday December 6 1991. Photocopies of your solution are acceptable. The solution (and winner) will be published in the February issue. The Pathword solution will be given next month. The winner of October's crossword (answer shown right) is Kevin Finn of Cheshire.

Across

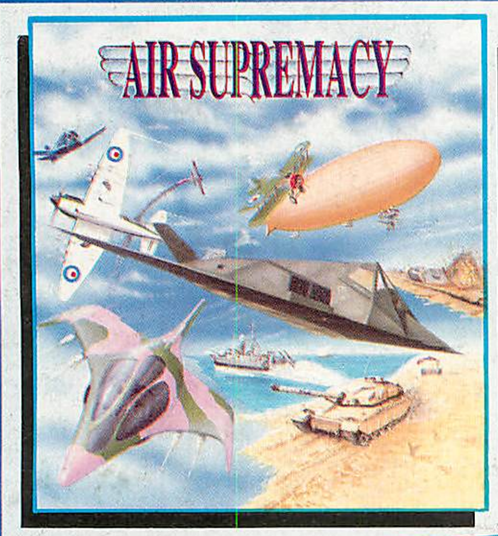
1 Gives fish as friendly gesture (9)
6 "Come in number 21!" (5)
9 It's up to you to apply lint dressing (5)
10 Phantom warlocks appear in rainy season (9)
11 Violent weather for excavations in southern hills (10)
12 Phone for the inmates? (4)
14 Roused by knowledge given in awed confusion! (7)
15 Responses induced by adding sulphur to lithium (not hydrogen) compound (7)
17 Fend off thousands on fairground ride (7)
19 Doctor treats diseases without aid and tends wounds (7)
20 Deity not unknown to change? (4)
22 Place to go for endless game in midwinter (10)
25 Contents of suppository are indeed lodged! (9)
26 Vet accepts bad lot; too many and he'll have a shock (5)
27 "Monsters? In these parts? Aye, 'tis true!" (5)
28 Medium tried about slander (9)

Down

1 Times when you are heard in fits of laughter (5)
2 Need about two right with a thousand linked up (9)
3 Salad-eating man has the heart of a hero and would never dream of using one (10)
4 Straightened out dodgy dealing (7)
5 Passes a note in middle of mime lesson (7)
6 Leave it after cutting flex (4)
7 Remains of Aztec artefact brought back from within (5)
8 Payments for August draws (9)
13 Those two may have one (10)
14 The longest day? (9)
16 Worried organisation ends talks and French lieutenant returns to meet leaders of European delegation (9)
18 Tight fit in shed was reorganised (7)
19 Interprets half-decent poetry (7)
21 Contribution has bad pun in it (5)
23 First thing to do after locking up? (5)
24 Exploits punsters (well, every other one) (4)



SUPERIOR SOFTWARE




Pacific 1944


Arabia 1991

AIR SUPREMACY

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In this totally new type of game/simulation, you can choose to swap between aircraft and ground or sea combat forces, as the battle develops. You start in 1918 in Europe, with biplanes and tanks, then proceed to level 2 in 1944 in the Pacific, with fighter aircraft and gunboats. Level 3 in 1991 involves jet aircraft and desert tanks, and finally to 2150 with futuristic aircraft and rapid attack hovercraft. As you progress, the action becomes faster and more difficult with the ordnance increasingly comprehensive. Mouse or keyboard control.

A3000/Archimedes

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In the 1 player game, try to get the highest break - you might even manage the maximum break of 147. In the 2 to 4 player game, compete against your friends and family for the highest score and highest break.

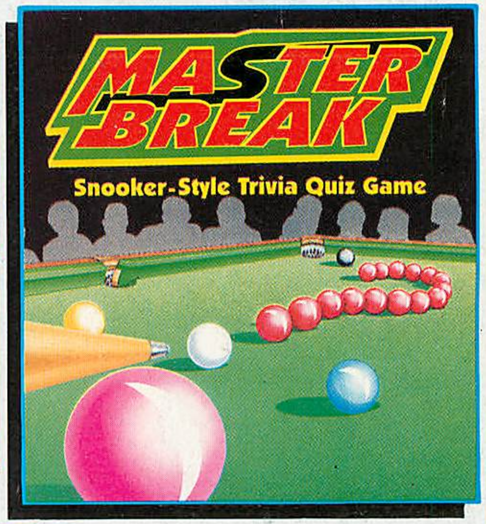
Start your frame with an easy red question, then choose your colour - have you the nerve to choose the black ball question? You've used all your PASSES and the ball is OVER THE POCKET - if you miss, it's a FOUL SHOT!

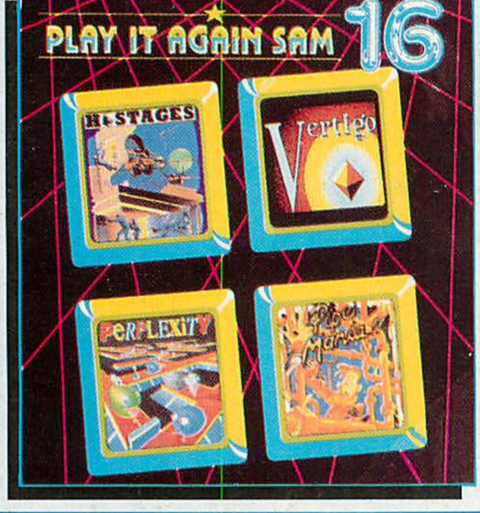
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BBC Micro/Master, Electron & A3000/Archimedes


BBC Micro/Master


A3000/Archimedes






Hostages


Vertigo

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BBC Micro/Master & Electron

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